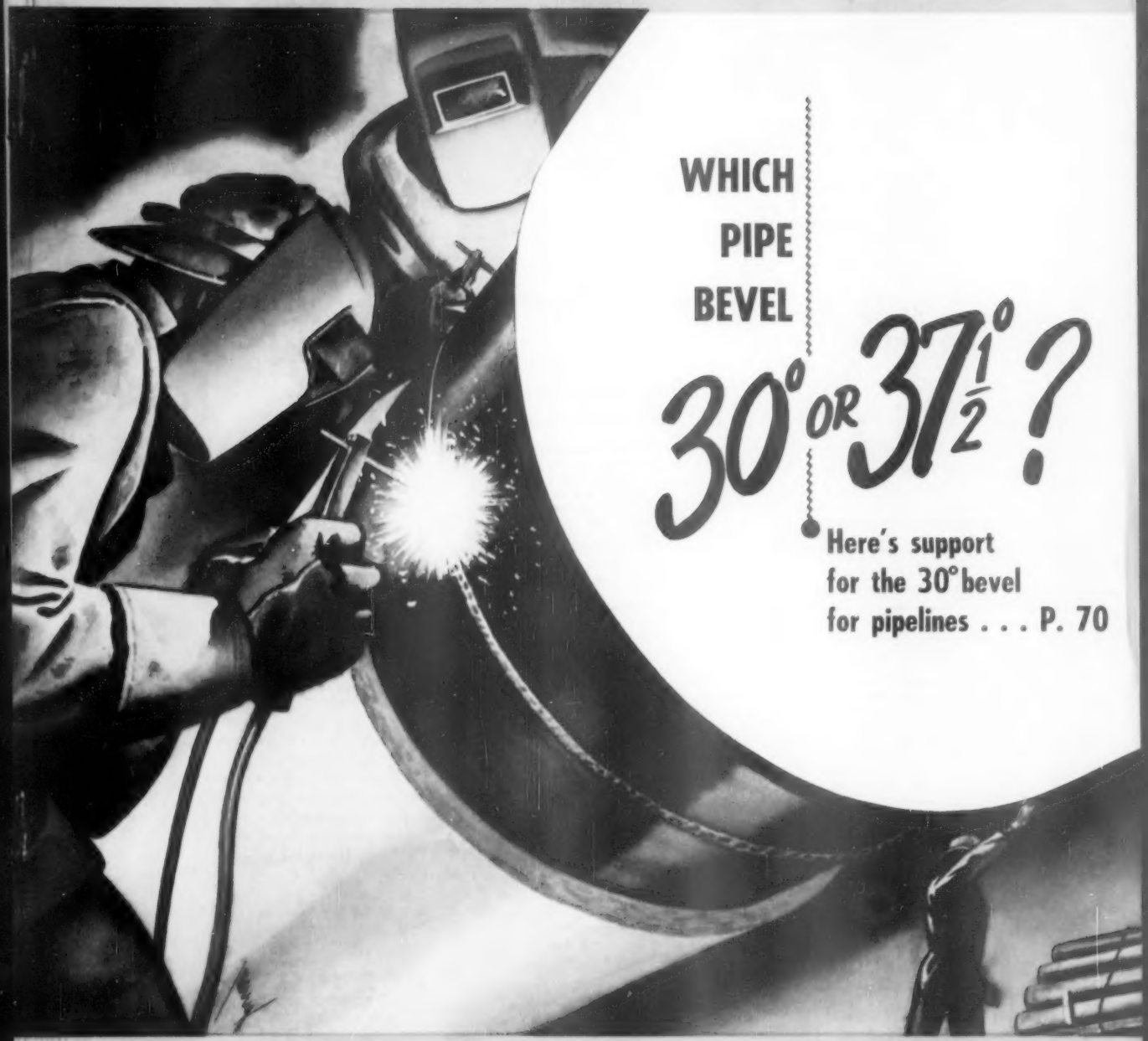
MAY 30, 1955

the OIL AND GAS JOURNAL



WHICH PIPE BEVEL 30° OR 37½°?

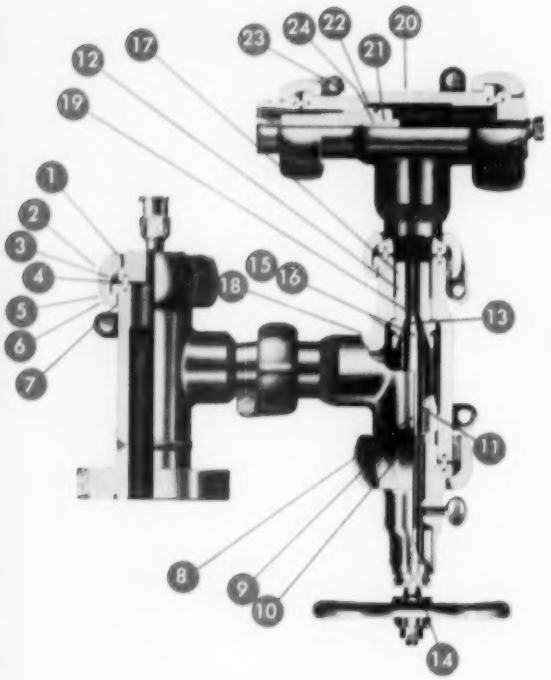
Here's support for the 30° bevel for pipelines . . . P. 70

FOREIGN FIELDS LURE U.S. INDEPENDENTS

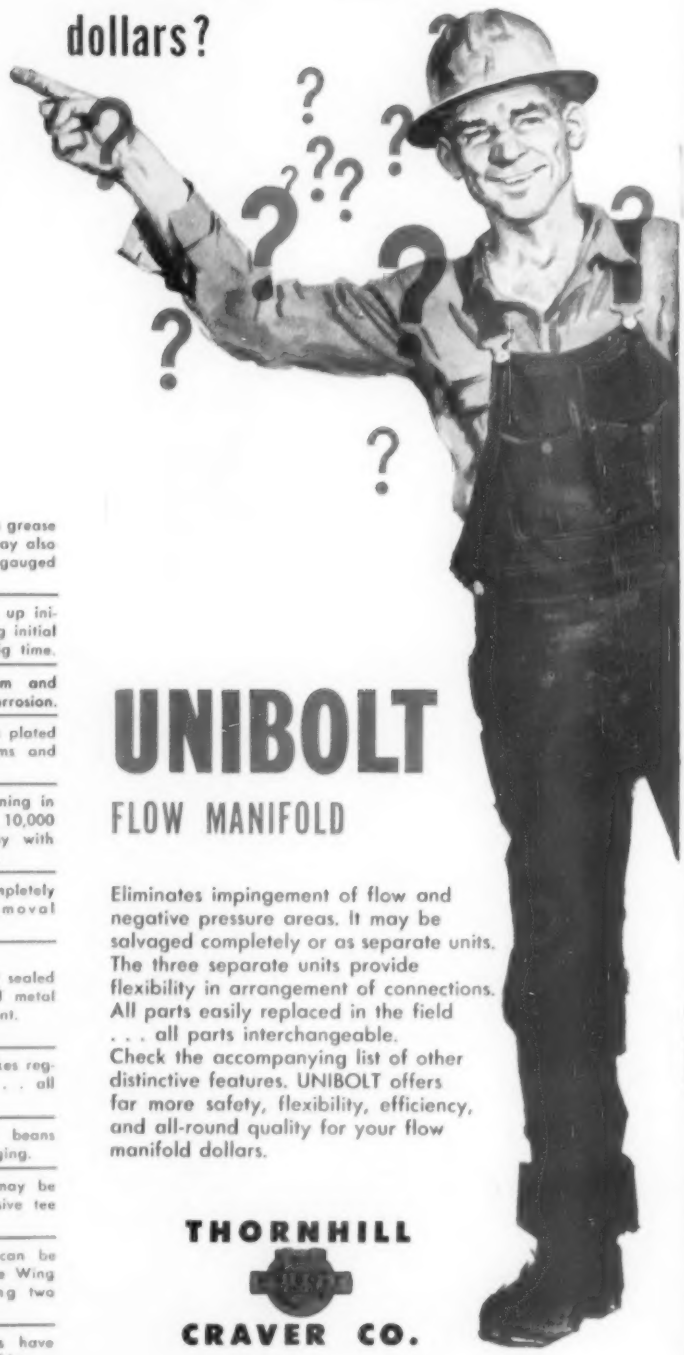
More and more are going abroad. Here's a Journal report on who's active and where . P. 46

COLD TIDELANDS WAR GETS HOT

Highest court will determine extent of Louisiana's ownership . P. 54



Are you getting all of these important features for your flow manifold dollars?



These are the "Extras" that make UNIBOLT the best buy of all manifolds

1	Tee cannot be accidentally opened.	13	Wing Valve requires no grease to effect a seal . . . may also be used as micrometer-gauged flow bean.
2	No exposed threads . . . no accidental damage.	14	Variable choke speeds up initial clean-up or running initial flow tests . . . saves rig time.
3	Concealed seat in groove . . . no accidental damage.	15	Nitride hardened stem and stem seat . . . resists corrosion.
4	All metal seat . . . not affected by high or low temperature.	16	Choice of hard chrome plated or "SA" stainless stems and seats.
5	Lubricators, bottom hole pressure adapters, and valves easily attached to Unibolt connection.	17	Unrestricted 1" opening in Wing Valve will pass 10,000 bbls. of fluid per day with 100 lbs. pressure drop.
6	2"—3000 lb. wp Unibolt 28% stronger than 2" — ser. 900 flange.	18	Wing Valve can be completely overhauled without removal from tree.
7	Unibolt stronger than tubing threads . . . ideal for working trees with welded lift nipple. Tubing threads in tee if desired.	19	Wing Valve stem seat sealed by power threads and metal gasket assures alignment.
8	Stem packing needs no tightening.	20	Positive Choke Body takes regular or "X" Beans . . . all beans flow-rated.
9	Stem turns freely under high pressures.	21	Shaped entrance on beans prevents paraffin clogging.
10	Threads on stem not exposed to external or internal damage.	22	Positive Choke Body may be replaced with inexpensive tee and cage nipple.
11	Full 2½" pilot for true stem alignment and rigidity.	23	Positive Choke Body can be converted to Adjustable Wing Valve by substituting two parts.
12	Streamlined flow — no obstructions . . . no turbulence.	24	Beans and stem seats have external hex for wrenching.

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FLOW MANIFOLD

Eliminates impingement of flow and negative pressure areas. It may be salvaged completely or as separate units. The three separate units provide flexibility in arrangement of connections. All parts easily replaced in the field . . . all parts interchangeable. Check the accompanying list of other distinctive features. UNIBOLT offers far more safety, flexibility, efficiency, and all-round quality for your flow manifold dollars.

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HOUSTON, TEXAS

PAGE 1 ONE . . . *a glance ahead*

Unexpectedly high demand so far this year and prospects this will continue, plus serious efforts to keep crude supplies and refinery runs in line with demand, have noticeably increased the industry's optimism, despite persistence of some trouble spots and danger signals.

Search for underground gas-storage sites near consuming centers will intensify if anything comes of attempts to reduce "dump" sales by pipelines for industrial use. Transmission companies must have some summertime outlet for gas to obtain a favorable load factor.

Crude-price structure may lose much of its historic uniformity through tendency of some refiners to improve profit margins by selective buying and reducing postings on types of crudes considered less desirable for their particular processing equipment and product-market situation.

Possibilities of uranium production are intriguing oil companies more than most of them care to admit. All are examining their lease terms to see whether or not uranium is covered. One major oil company has just taken a lease covering uranium only on huge acreage of railroad land.

Supercharging of big gas engines on pipelines is paying off in some unexpected reductions in maintenance costs. Less cylinder heat and absence of detonation at high loads has tripled ring wear after superchargers were added to old engines.

Mild hydrogen treatment promises to become the refiner's workhorse, widely used to desulfurize and otherwise improve everything from naphthas to waxes. Residuals may benefit eventually, but at present all byproduct hydrogen from cat reformers can be put to good use improving distillate products.

the OIL AND GAS JOURNAL

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TECHNOLOGY—OPERATION

30° Pipe Bevel Best for Pipelines 70
By L. J. Cunningham and S. V. Williams

Recently revised A.P.I. standards call for 37½° bevel on line pipe ends, in place of the 30° bevel which has been used for years. Tests outlined in this article showed the change to be unwarranted. The smaller bevel results in a better weld and in less welding time. A big saving in welding metal is also effected.

Better Well Completions with Shaped Charges 74
By R. D. Cocanower

A new charge-positioning technique has been developed for better well completions. This new method provides for increased hole size of perforations and a more efficient way of perforating wells with six shaped charges per foot.

Weather Shapes Design of a Natural-Gasoline Plant 76
By J. B. Taylor

Signal's Tioga, N. D., natural-gasoline plant is a "dry" plant because of the severe winter weather conditions. The gas is dehydrated before absorption. The control room is designed so that all operating conditions can be controlled and observed without leaving the room.

What's Ahead in Rig Design? 79
By R. L. Walker

This is a second of two articles on trends and thoughts in drilling-rig design. The three basic types of rigs were discussed in Part 1 which appeared last week. Here the author answers various specific questions relative to these designs, such as legal load and size specifications, the types of portable masts, reasons for two-speed drives to each pump, and design features of universal joints available.

How Well Stream Composition Affects Degree of Separation 84
By John M. Campbell

Amount of normal pentane plus in the well stream is most important factor in determining quantity of stock-tank fluid in the separator. Specific gravity of the well stream depends on separator pressure. Below 20° F., composition is the prime factor affecting the quantity of the stock-tank fluid in the separator.

Operating Tips on Solvent Extraction of Lube Oils 95
By John C. Reidel

Phillips Petroleum Co. has a highly efficient solvent-extraction lube-oil operation at its Kansas City refinery. Crudes are carefully selected. First preparation is in a two-stage volume unit. A two-stage propane deasphalting step is used, and a 90-ft. phenol tower provides more contact stages than usual.

On the Job . . . In the Plants 99

Magnolia Petroleum's Seeligson cycling plant in Jim Wells County, Texas, provides a good example of how to get more out of processing equipment. A more efficient method of butane cooling in the refrigeration system has been developed. An improved waste-water disposal system is used. Steam lines are equipped with cutoff controls to protect the steam system from possible oil backup. A modification in the backwash procedure on the oily condensate filters has minimized loss of filter bed charcoal.

REGULAR FEATURES

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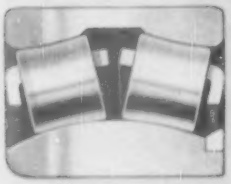
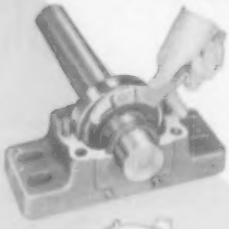


FREE-ROLLING SELF-ALIGNMENT. Adjusts immediately in all directions, assuring full load capacity, even when subjected to shaft deflections and inaccuracies of mounting. Important because "Mill Bearings" are subject to heavy, sudden shock loads.

ONE BASIC HOUSING accommodates either type of seal shown at left. They keep lubricant in and dirt out.

Left, Spiral Labyrinth Steel Seals for best conditions, oil or grease lubrication. Right, combination felt and synthetic rubber contact type seal for dusty conditions, grease lubrication.



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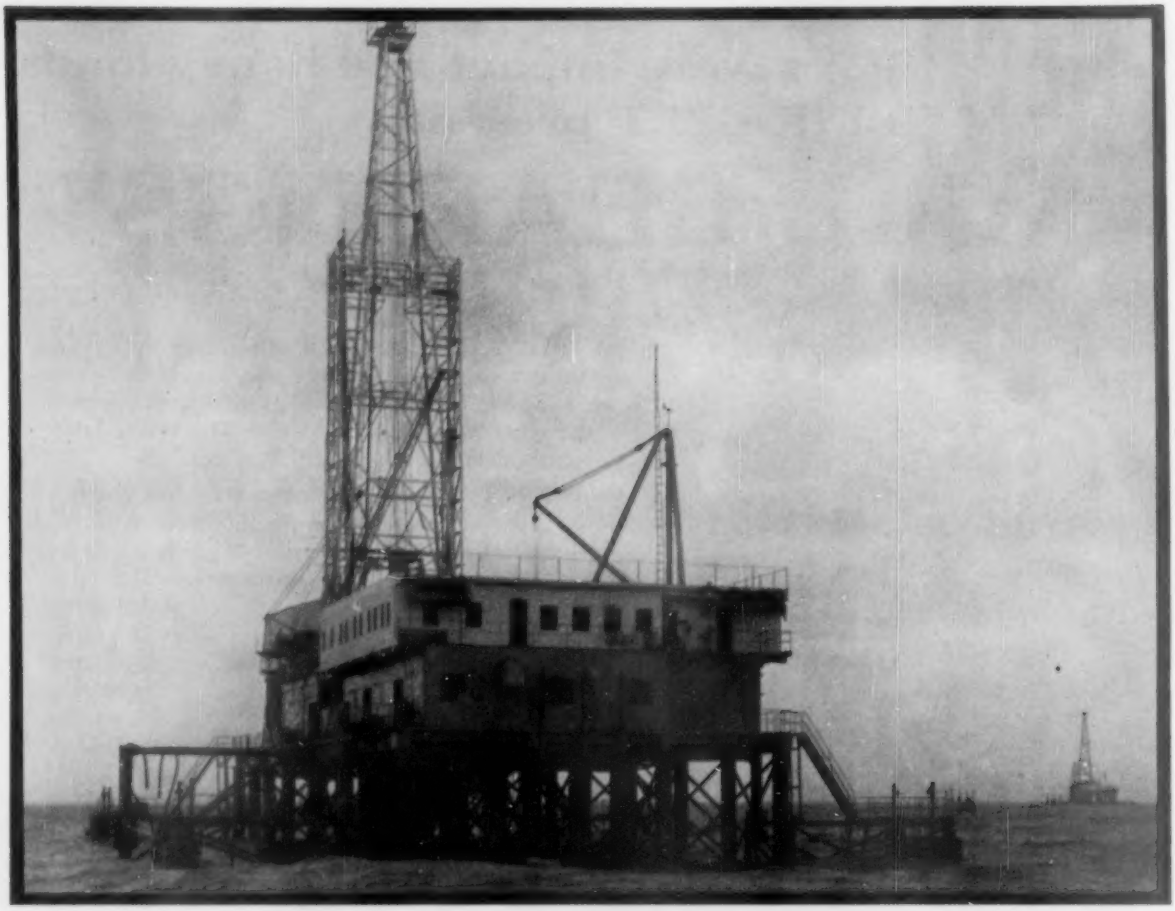

ALEXANDER COMPLETES NO. 2 FOR ODECO
JOHN HAYWARD JOINS MR. CHARLIE IN GULF

Alexander Shipyard continues its pace-setting activity in deep-water drilling design and construction by completing Odeco's second offshore drilling giant, the John Hayward. Alexander's first barge for Odeco was the much heralded Mr. Charlie, (pictured in background) after which the John Hayward was patterned.

The submersible barge is 180′ x 60′ x 10′ with an overall height of 74′ from the bottom of the hull to the top of the helicopter deck. Its drilling capacity is 18,000 feet in 30 feet of water and it comfortably accomodates 40 men in air-conditioned quarters.

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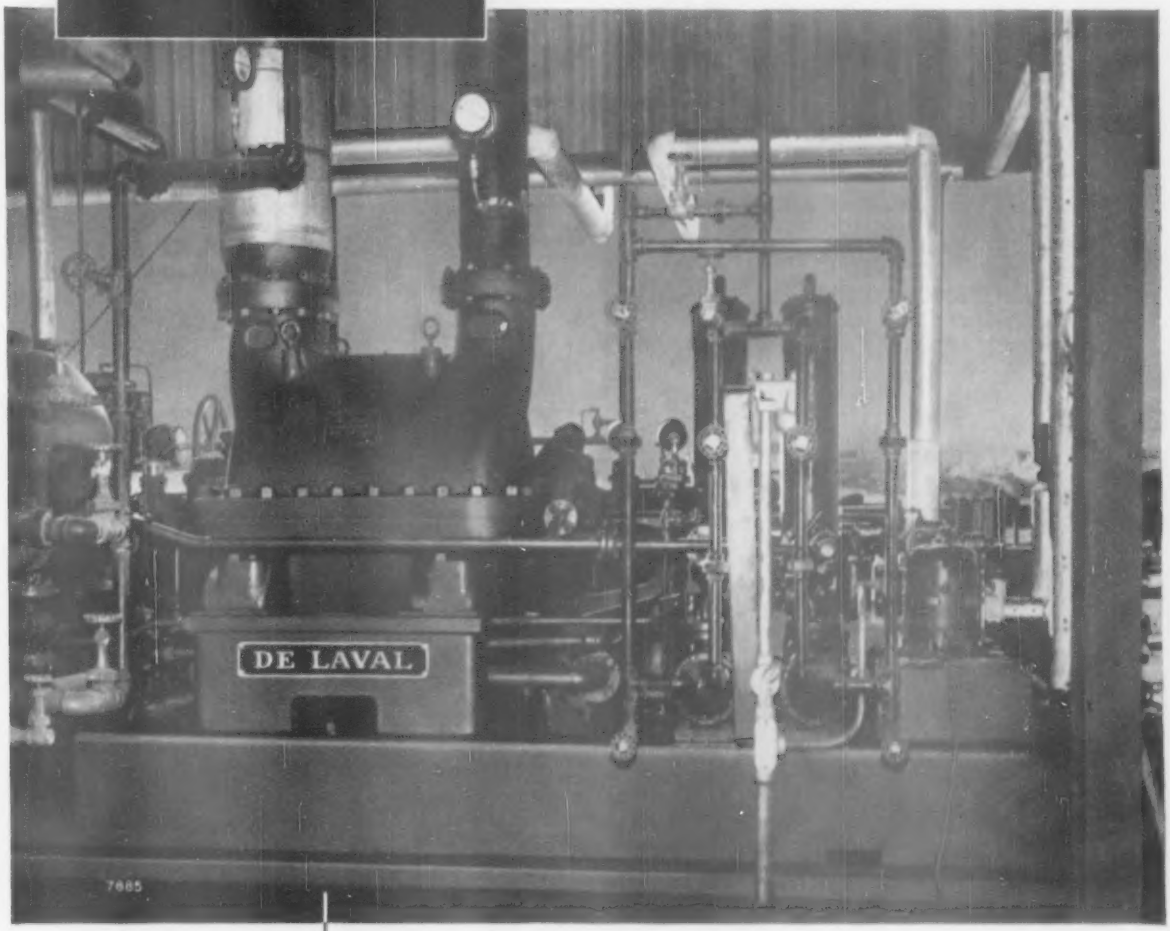
PIONEERS IN OFFSHORE DESIGN AND CONSTRUCTION

DE LAVAL CENTRIFUGAL COMPRESSOR

handles propane-butane for M. W. Kellogg alkylation unit



New Bulletin 0504 gives complete data

On stream at a plant of a large mid-western refiner, this De Laval unit compresses the propane-butane mixture to prepare it for an M. W. Kellogg alkylation unit.

Inlet volume of the De Laval centrifugal compressor is 3,040 cubic feet per minute. Inlet pressure is 18 psia, and discharge pressure 85 psia. This compressor is equipped with De Laval contact-type oil seals. The unit is driven by a 600 bhp turbine running at 7,400 rpm.

De Laval compressors are designed and built for heavy duty continuous operation. Rugged, horizontally split casings, individually designed impellers, perfectly balanced rotors and externally mounted, cylindrically seated bearings assure optimum performance and long service.

DE LAVAL *Centrifugal Compressors*

DE LAVAL STEAM TURBINE COMPANY
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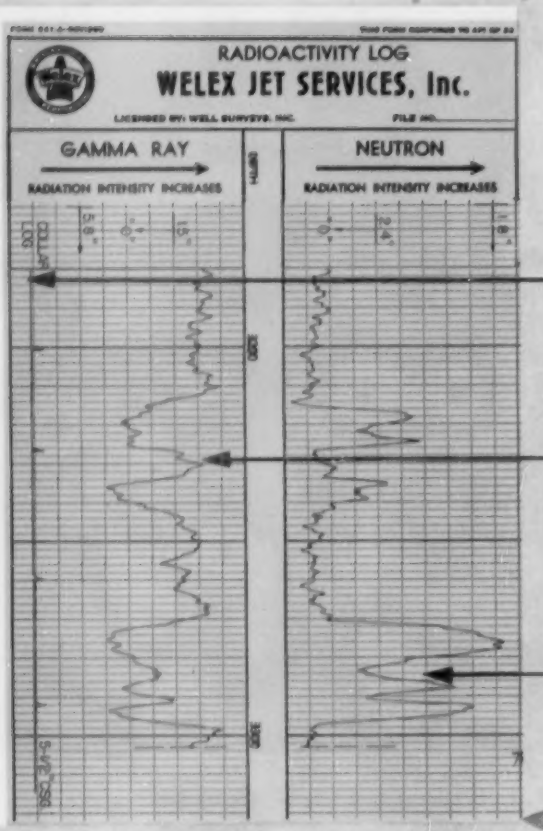
DL 309

Welex GIVES YOU 3 CURVES IN 1 RUN IN SIMULTANEOUS R/A LOGGING



The Casing Collar Log accurately locates your casing collars and definitely ties them in depth to the tops and bottoms of the formations, as indicated by the Gamma Ray—Neutron Curves. The Casing Collar Log is run simultaneously with the Gamma Ray—Neutron Curves at no extra cost to the operator.

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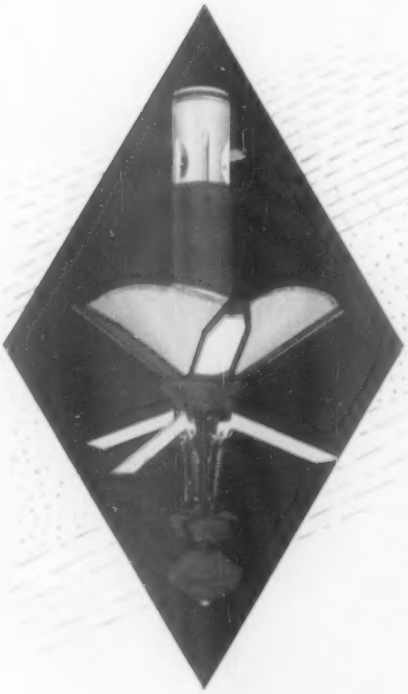
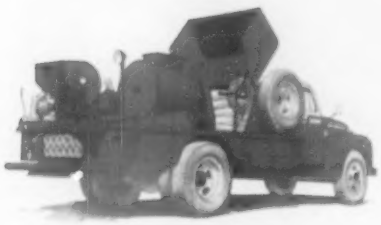


HALLIBURTON'S DUMP BAILER SERVICE

Demonstrated ability to deliver fast first aid for remedial work—whenever and wherever required—is one of the most important reasons for the success of Halliburton's Dump Bailer Service. Costly down time can be changed to profitable production time soon after the efficient Dump Bailer truck rolls up to your rig.

A wide variety of remedial jobs—everything from plugging and bridging to speedy repair of casing leaks—can be immediately handled with the materials and equipment carried on the modern Dump Bailer truck. The new DB Bridging Basket that makes permanent or temporary bridge building a one trip operation; special aluminum alloy bailer sections; proved cements, resins and plastics; and even uncontaminated mixing water are available for immediate use. Plugging materials are quickly blended by a truck mounted mixer that provides complete blending of all needed materials.

With the Halliburton combination of modern equipment and materials, you can be sure of faster, safer work on every remedial job. You'll find that you can reduce rigtime and cut costs by calling for the Dump Bailer Service that is ready to roll anytime—anywhere! Call your local or district office of the Halliburton Oil Well Cementing Company.



A new bulletin describes the special equipment, materials and new applications of Dump Bailer Service. Call your nearby Halliburton office for a free copy.

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This means that INTERNATIONALS, with all their comfort and ease of handling, are engineered and built to give you a longer lifetime of more constant service . . . with less time *off* the job, more time *on* the job, and fewer repair bills along the way. They save you the *big* money . . . the operation and maintenance money.

The proof is in the records of cost-conscious operators . . . and in sales records, too. INTERNATIONAL has led in heavy-duty sales for 23 straight years . . . in "6-wheel" sales 20 straight years . . . in "multi-stop" sales 17 straight years!

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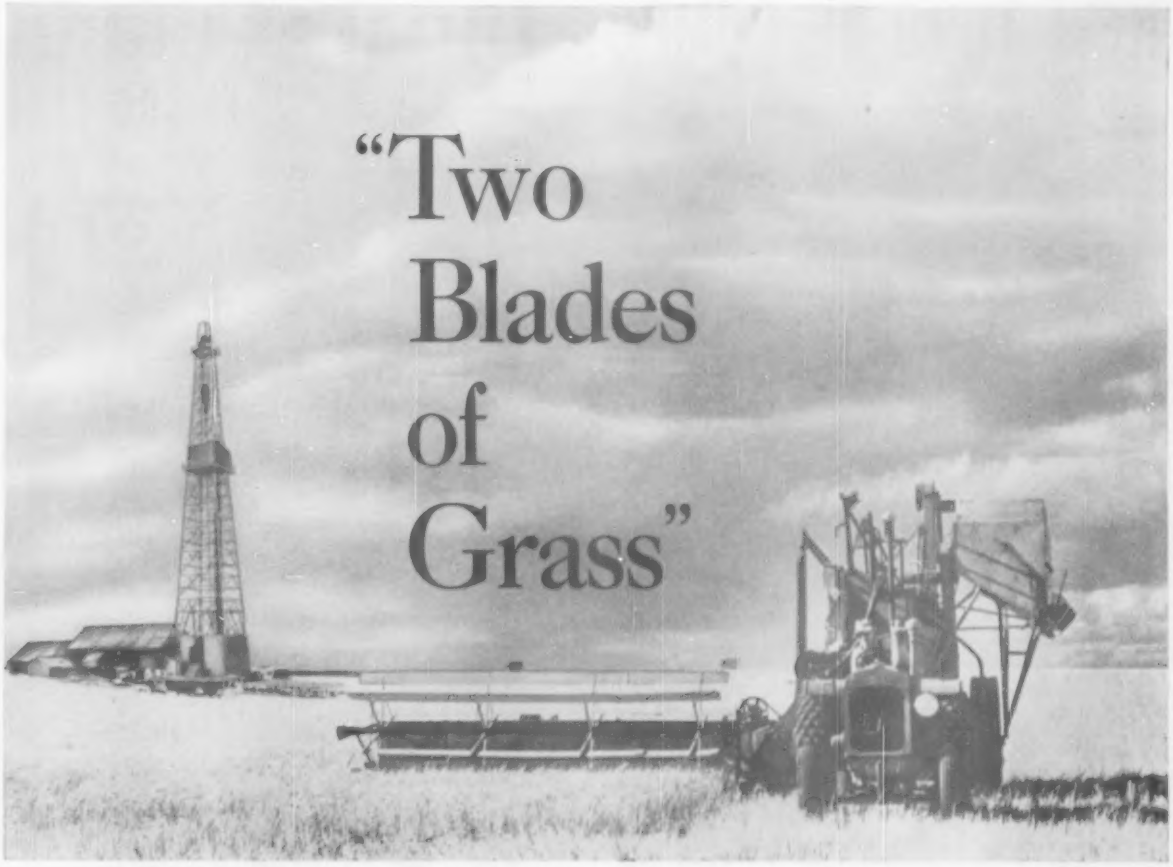


TWO CENTURIES ago Voltaire said, "He who makes two blades of grass grow in place of one renders a service to the nation." The job of Standard Oil Company (New Jersey) and its affiliates is something like that – to produce oil where none was produced before and, by so doing, to create wealth for everybody.

How well have we been doing this job? Our Annual Report for 1954, which has just been sent to the 300,000 shareholders who own Jersey Standard, tells about it.

It tells how wealth was created by extending known oil fields . . . And by discovery of new ones . . . By converting crude oil, itself of little value, into hundreds of useful products . . . By moving petroleum products from where they were made to where they were needed.

All these things helped the people and strengthened the nations where we do business.

Some highlights of these activities, drawn from the Annual Report, are set forth here as a matter of public information.

1. During 1954, the free world used more oil than ever before. And oil is energy, which is basic to the world's progress.

2. To meet these needs, our affiliates produced and refined more oil than ever before in the Company's history. But additions to oil reserves were greater than the oil used.

3. We had vigorous competition everywhere. There is nothing like competition to bring you better products and service.

4. 1954 was our top year in sales, earnings, and dividends paid to owners.

5. During the year, we spent 764 million dollars for new equipment and for exploration. Since World War II, we have spent 5 billion dollars for the means to meet your future oil needs.

6. Research was productive. Our research affiliate obtained more patents on products and processes than any other oil company. In Linden, N. J., the first atomic laboratory in the oil industry is being built to study the uses of radiation in oil refining.

7. Current developments in atomic energy will mean greater availability of electric power: increased mechanization, expanded industry, and greater use of petroleum products. The oil business will gain, and you will have the benefits of both kinds of energy.

8. We played an important part in arranging to return Iran's oil to world markets.

9. A world's safety record for major refineries was set by Esso employees at Baton Rouge, La....7,911,769 man-hours with no disabling injury. This passed the previous record by more than a million man-hours.

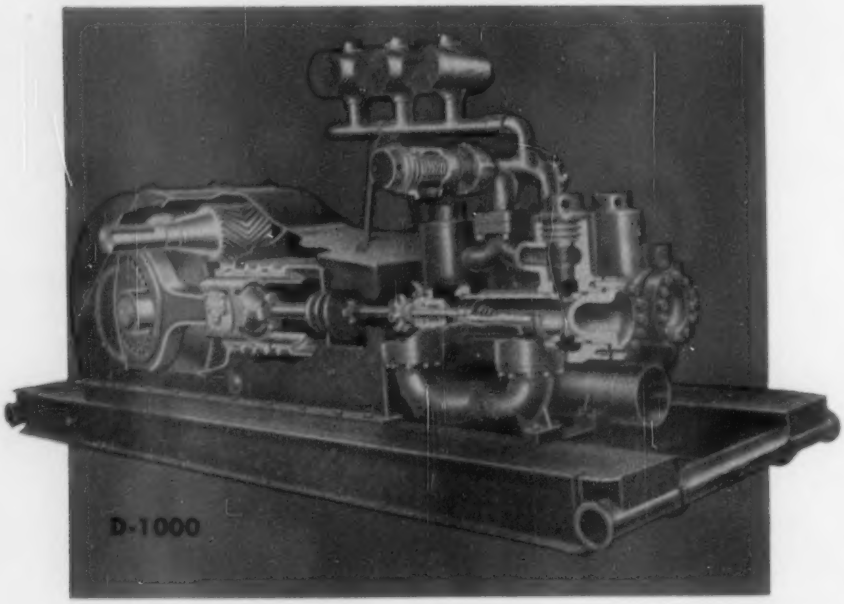
10. We have long supported education through our taxes. We have also felt an obligation to aid privately supported colleges and universities, which are an important source of new employees and of informed citizens. During 1954, we contributed about a million dollars to such institutions.

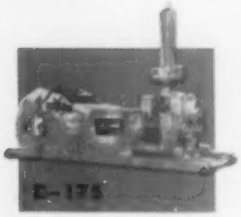
**If you wish a copy of the full Report for 1954, write to Standard Oil Company (New Jersey), Room 1626, 30 Rockefeller Plaza, New York 20, N.Y.*

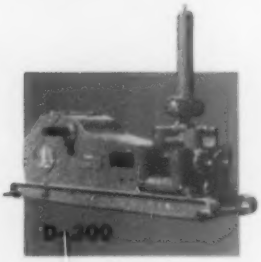
STANDARD OIL COMPANY (NEW JERSEY)
AND AFFILIATED COMPANIES

Esso

NEW 1000 HP PUMP... ADDED TO THE ALL-STEEL EMSCO LINE

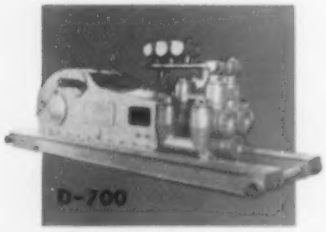






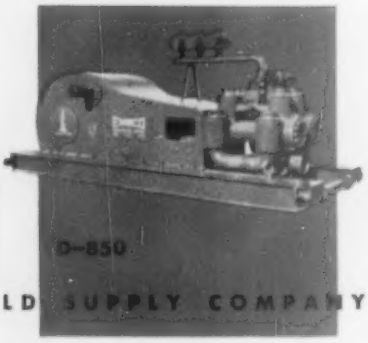
EMSCO D-1000

Pound-for-pound EMSCO provides more pumping capacity than any other pump on the market today. Compact design means greater economy in transportation . . . easier handling at the rig. EMSCO features provide high efficiency, long service life and low cost operation.



PESA

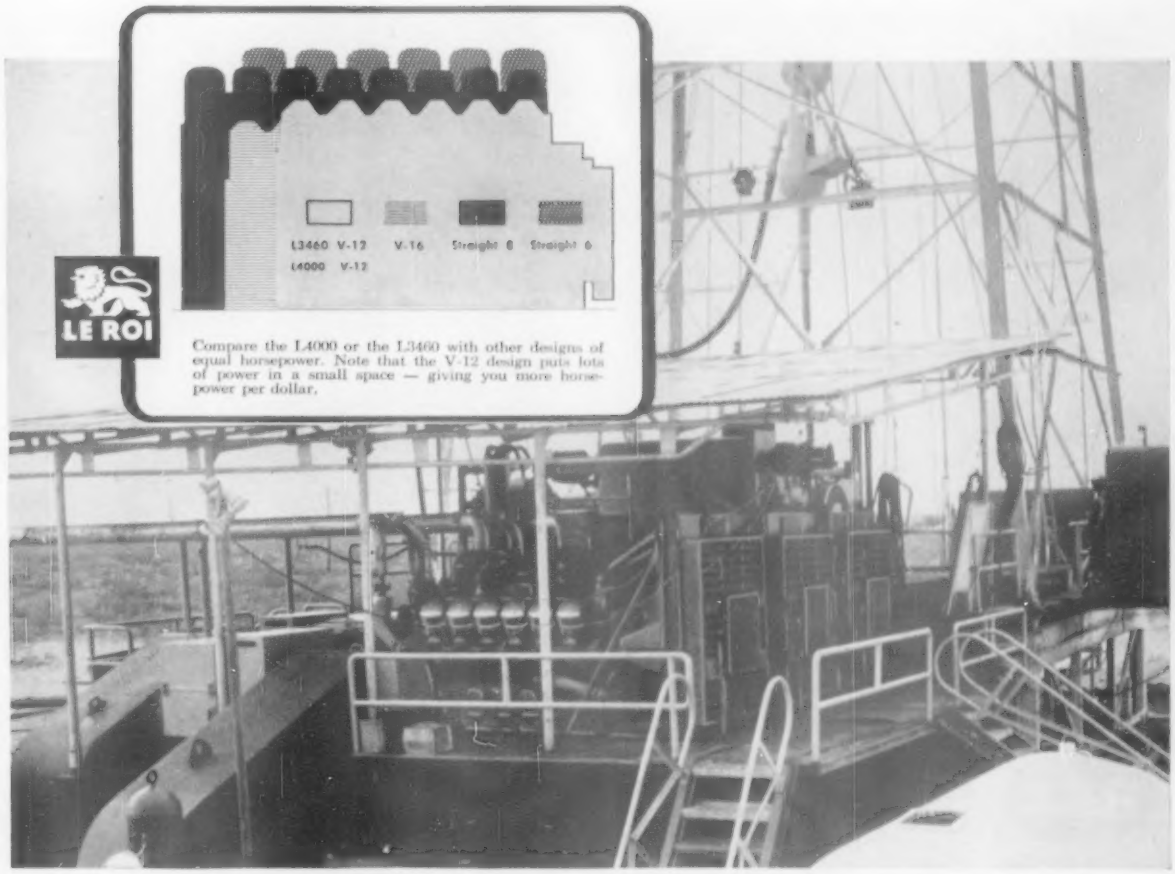
For complete information contact your nearest Mid-Continent Supply Company store or representative.



MID-CONTINENT Supply Company

MID-CONTINENT BLDG. FORT WORTH, TEXAS

THE WORLD'S LARGEST INDEPENDENT OIL FIELD SUPPLY COMPANY



Compare the L4000 or the L3460 with other designs of equal horsepower. Note that the V-12 design puts lots of power in a small space — giving you more horsepower per dollar.

An engine doesn't have to be BIG to be POWERFUL!

The compact, V-12 design of Le Roi's L4000 and L3460 proves it!

Le Roi's L4000 and L3460 engines represent the first truly new design concept in 15 years. They are compact high-output engines, designed with short stroke to give you greater horsepower and speed without compromising engine life.

In addition to the advantages of short-stroke design, these modern V-12's have lightweight pistons, short-radius rotating parts — hydraulic tappets — crankshaft vibration dampener — sensitive controls. That's why they give you hair-trigger response to load demands.

The fuel economy of these engines is good, too. Thanks to advanced-design manifolding, low friction bearings, and low power loss to accessories, they give you rock-bottom fuel consumption.

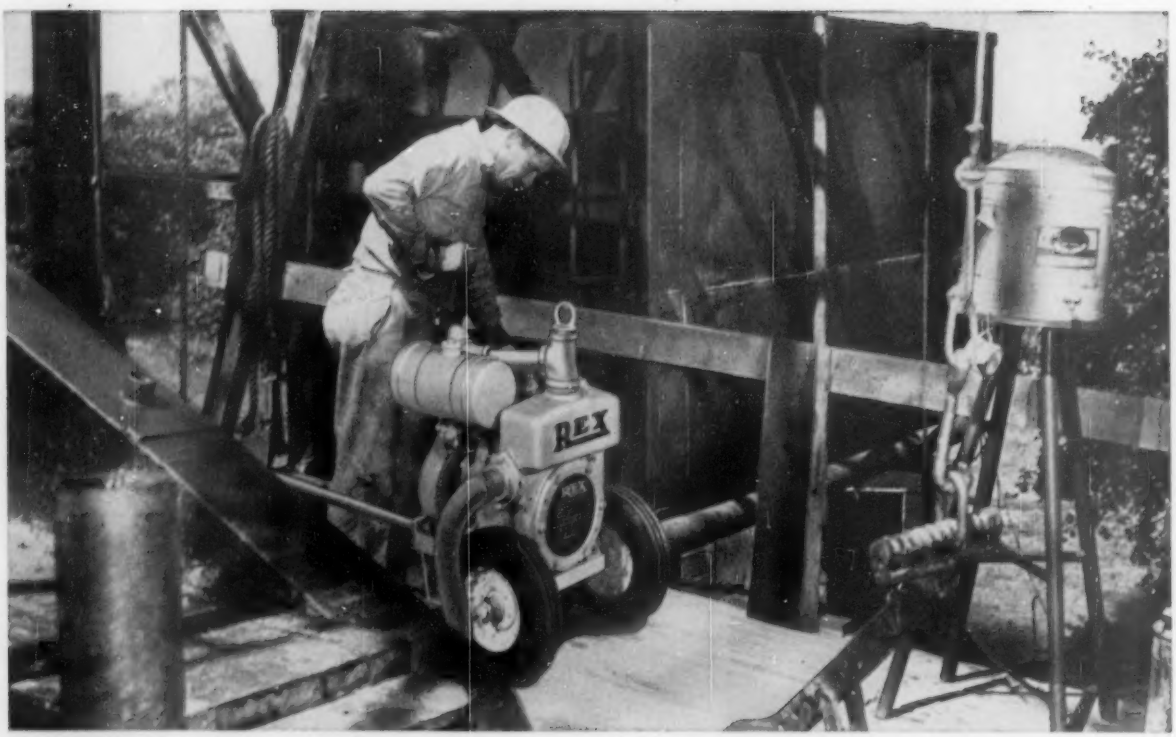
Yes, big surprises come in small packages. That's especially true of the L4000 and L3460. These engines are conservatively rated to give you plenty of power in reserve. The L4000, for example, provides 655 max. hp. and the L3460, 600 max hp. And they have a wide speed range, too, up to 1350 rpm. That's why these engines are ideally suited to a great many oilfield applications: drilling, pipeline station, generator, gas booster, etc.

Engines may come bigger than these Le Roi's, but they sure don't come better! See for yourself — ask your supply house or Le Roi distributor to show you an L4000 or L3460 at work. Call him soon. Bulletins are also available — just write for them.

LE ROI *Division of Westinghouse Air Brake Co.*

Milwaukee 14, Wisconsin

PORTABLE AIR COMPRESSORS TRACTAIR STATIONARY AIR COMPRESSORS AIR TOOLS ENGINES



REX®

Speed-Primer Pumps Last Longer ...and we can prove it!

Here is the finest pump you can buy for oil field work, and we can prove it with better service, longer pump efficiency and lower costs than with any other pump you can buy.

It's easy to figure the Rex Speed-Primer Pump will give longer service when you consider it's the *only* pump with the patented adjustable air peeler that maintains *new* pump efficiency for the life of the pump.

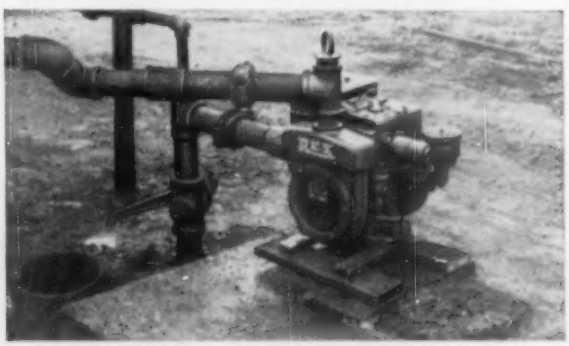
Other reasons we boast about this pump are...instant starting in cold and wet weather...ability to give maximum capacities with mud- and debris-filled water...simplicity of maintenance...portability...positive leakproof seal...and a host of other outstanding advantages that mean top performance under all conditions.

Ask any Rex Pump owner or check at your Oil Field Supply Store. They'll prove what we say! For information on the supply stores that handle Rex Pumps write Rex Oil Field Sales offices in: New York, Tulsa, Dallas, Houston, Midland or Los Angeles.

CHAIN BELT COMPANY

4619 W. Greenfield Ave., Milwaukee 1, Wisconsin

Easily portable, Rex Pumps are the choice for transfer operations, salvaging oil from slush pits, dewatering around storage tanks and general utility service around pipelines and refineries.



Completely self-priming, the Rex Pump has the power and capacity to move big volumes horizontally or vertically. It's an excellent pump, too, for stationary installations as shown here.

Sheffield bolts beat big league baseball deadline

Structurals of Kansas City's Major League Stadium were bolted together in record time.

When Kansas City acquired the American League franchise from Philadelphia last November, the old city ballpark had to be rebuilt to major league standards in time for the new Kansas City Athletics opening game April 12. It was done, thanks in no small part to the speed and ease of installation of Sheffield High-Strength Structural Bolts.

Two men can fit and tighten approximately 400 bolts in a working day, compared with 300 to 350 rivets for average *four-man* riveting crew.

The cost of an installed high-strength bolt is estimated by many erectors at 50¢ as against 80¢ for a rivet. Sheffield High-Strength Bolts, because of their greater clamping and load strength, add to the life of the structure... stay tight even under vibration caused by thousands of feet stomping in unison.

SHEFFIELD STEEL

DIVISION

ARMCO STEEL CORPORATION

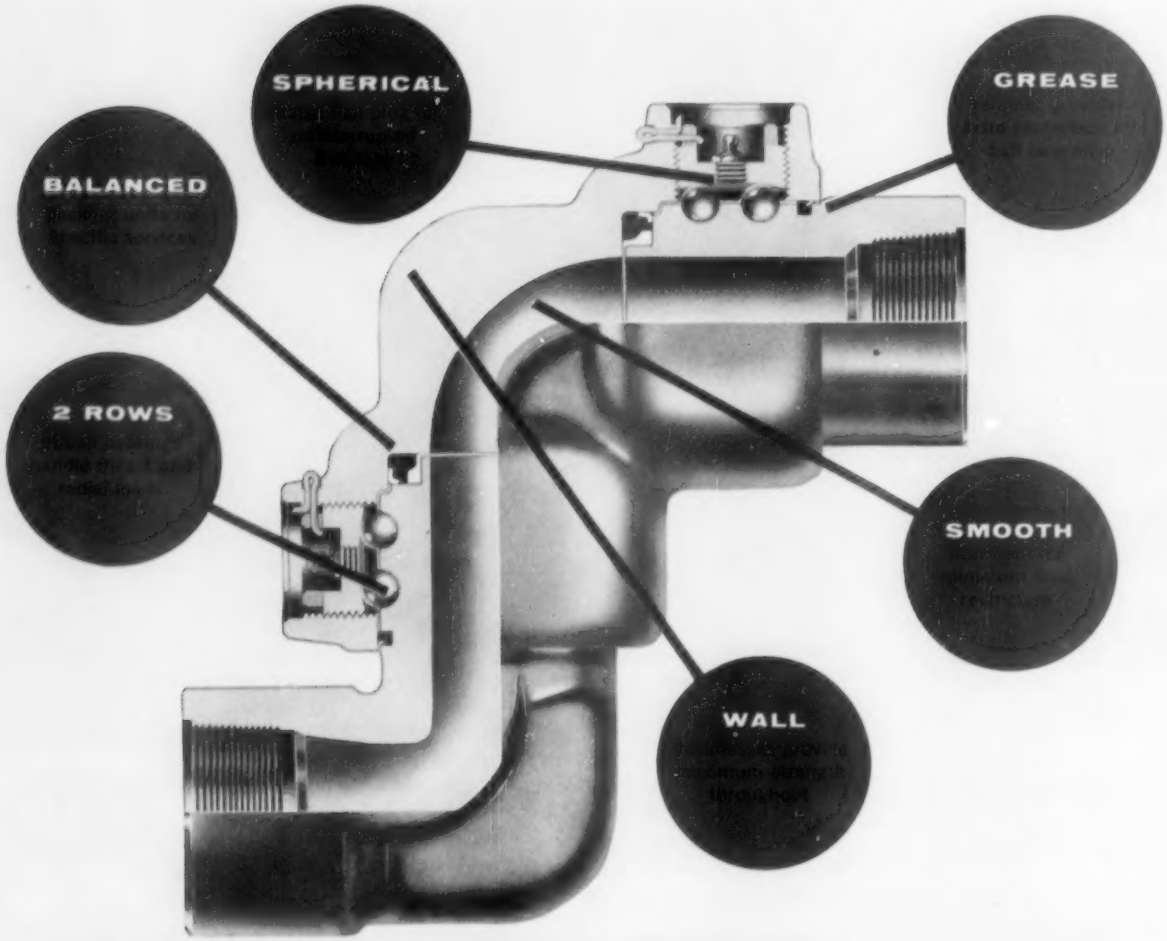
SHEFFIELD PLANTS: HOUSTON KANSAS CITY TULSA

Write for copy of High-Strength Bolt book entitled "Successor to the Rivet."

SHEFFIELD

ARMCO

High-Strength Structural Bolts



precision engineered for your service

CHIKSAN Ball-Bearing Swivel Joints are precision engineered like a fine watch to give unlimited flexibility and unlimited service in the conduct of fluids, gases and liquids.

CHIKSAN is the originator and largest exclusive manufacturer of ball-bearing swivel joints in the world today.

CHIKSAN produces packing designs for specific service requirements, assuring constant torque at any given pressure.

CHIKSAN has acquired a world-wide recognition for highest quality of product and lowest maintenance costs.

CHIKSAN has over a quarter of a century of "know-how" in the design, manufacture and successful scientific application of ball-bearing swivel joints in industry.

CHIKSAN offers the widest range of styles, sizes and pressures available for every major industrial use today.

CHIKSAN has complete nation-wide coverage of its products and applications by qualified field service engineers.

CHIKSAN will custom engineer for you the solution to any problems involving the transport of fluids, gases and liquids.

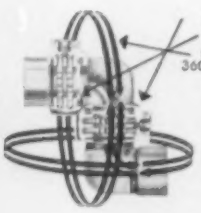
Write CHIKSAN for latest INDUSTRIAL CATALOG—G-4 Dept. OGJ-5A

Supply and Service of CHIKSAN Ball-Bearing Swivel Joints is always as near as your telephone.

The Flow of Enterprise Relies on

CHIKSAN

Ball-Bearing Swivel Joints

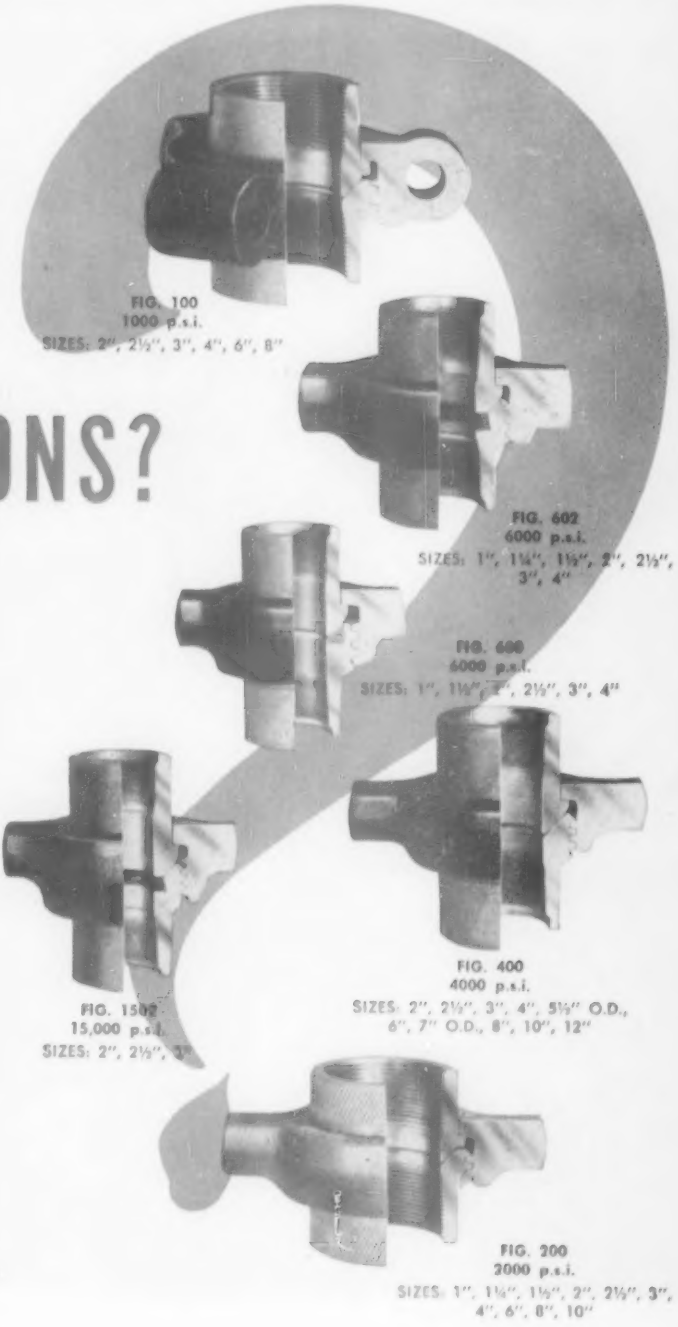


CHIKSAN Ball Bearing Swivel Joints are THE NEW TOOL of Modern Industry with full 360° rotation in 1, 2, and 3 planes. Over 1,000 different types, styles, and sizes have been developed for pressures and services from 28" vacuum to 15,000 psi and for temperature ranges from minus 70° to a plus 500° F. with packing materials for each specific service.

CHIKSAN COMPANY • BREA, CALIFORNIA • Chicago 3, Illinois • Newark 2, New Jersey

Well Equipment Mfg. Corp. (Division), Houston 1, Texas • Subsidiaries: Chiksan Export Co., Brea, Calif.; Newark 2, N. J. • Chiksan of Canada Ltd., Edmonton, Alta.

WHY is it WISE to Standardize with WECO UNIONS?



• *Here is a trio of time-and-cost-trimming reasons:*

INTERCHANGEABILITY . . .

All WECO Union parts are interchangeable in the same size and pressure rating with complete assurance of a leak-proof seal. On lines that are made-up and broken-out repeatedly this, particularly, is a great time and cost cutter.

SERVICEABILITY . . .

The famous ball and cone seat . . . the tough Acme Threads . . . the rugged extra duty wing nut and heavier wall sections have made WECO Unions synonymous with service: long-lasting, leak-proof service you can trust on job after job.

AVAILABILITY . . .

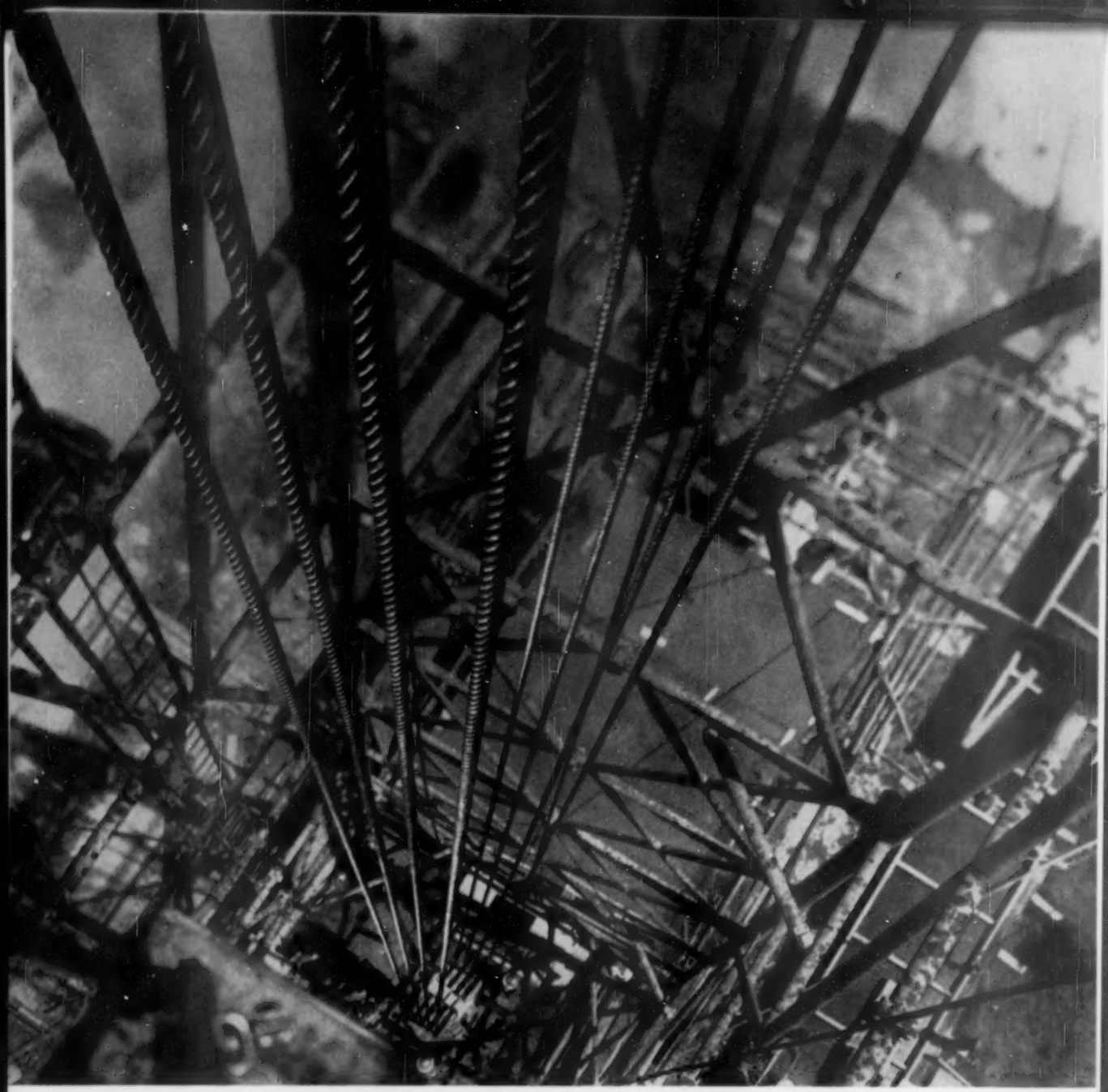
WECO's wide range of unions in sizes from 1" to 12" — in pressures from 1,000 to 15,000 p.s.i. — assures you the right union for every job. And they are as close as your nearest supply store — wherever oil is drilled or produced.

• *Whenever you need unions, see for yourself why it is wise to Standardize with WECO.*

U-8-55

it's wise to standardize with.. **WECO**

WECO WELL EQUIPMENT MFG. CORP. • Division of Chiksan Company • HOUSTON 1, TEXAS



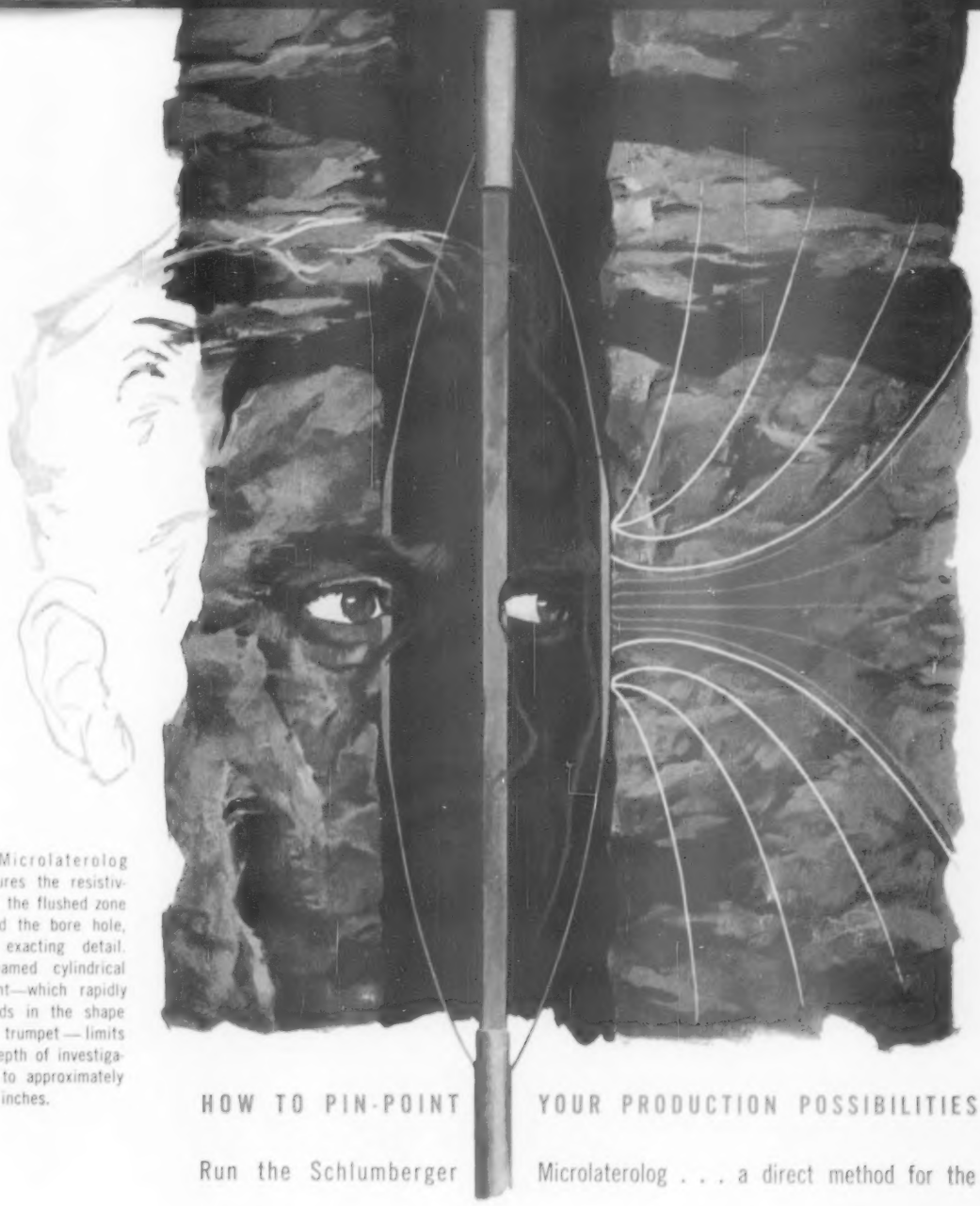
Wire Rope at Work—This was a workover job in a field where dual completions are often required. The well was better than two miles deep, and the rig had its work cut out for it. Not only did the job demand more trips than usual, but it was sometimes necessary to pull stuck liners. When stubborn conditions developed, the rig components were in for a tussle.

Because unusually high stresses were common, the contractor selected Bethlehem Purple Strand for his wire rope needs. He decided upon 1⅛-in. Form-Set (preformed) 6 x 21 Seale, and also specified independent wire rope core for maximum resistance to crushing. This combination proved exactly right for the job, which was tough enough to test the mettle of any rig—and any rope.

Bethlehem Steel Company, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

Mill depots and distributors from coast to coast stock Bethlehem rope for the following industries and numerous others:

PETROLEUM • MINING • CONSTRUCTION • EXCAVATING • QUARRYING • LOGGING • MANUFACTURING



The Microlaterolog measures the resistivity of the flushed zone around the bore hole, with exacting detail. A beamed cylindrical current—which rapidly expands in the shape of a trumpet—limits the depth of investigations to approximately three inches.

HOW TO PIN-POINT YOUR PRODUCTION POSSIBILITIES

Run the Schlumberger Microlaterolog . . . a direct method for the calculation of porosity—and a valuable aid in electrical log interpretation. Resistivity values from the Microlaterolog lead directly to an evaluation of formation factor and porosity. This information, coupled with data from the conventional electrical log, or the laterolog, makes it possible to calculate the oil saturation in the reservoir.

CALL YOUR LOCAL SCHLUMBERGER ENGINEER FOR FURTHER DETAILS

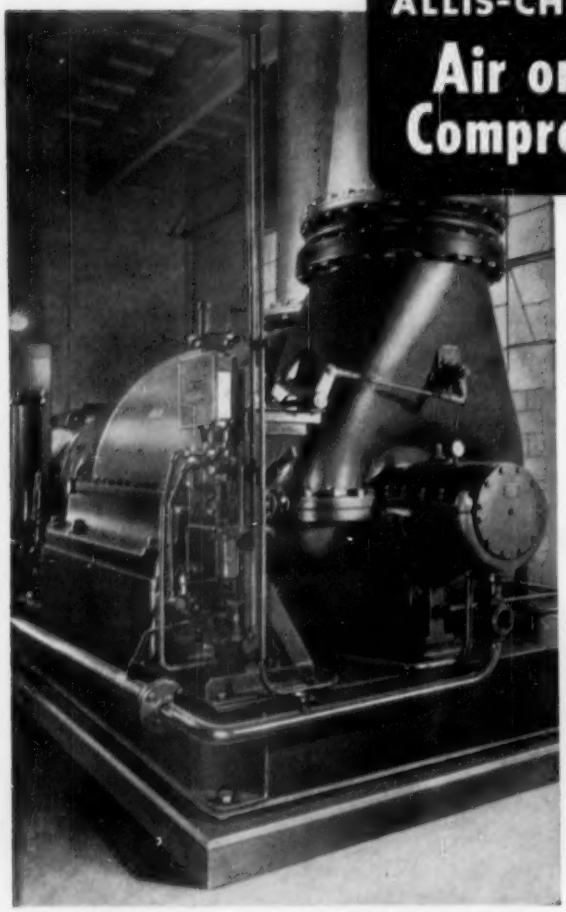
THE EYES OF THE OIL INDUSTRY

SCHLUMBERGER

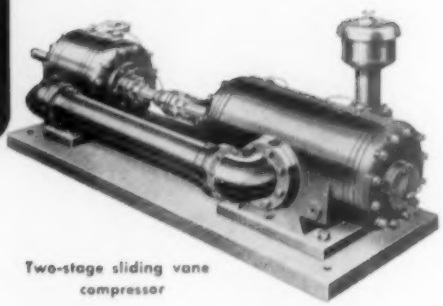
Well Surveying Corporation

ALLIS-CHALMERS

Air or Gas Compressors

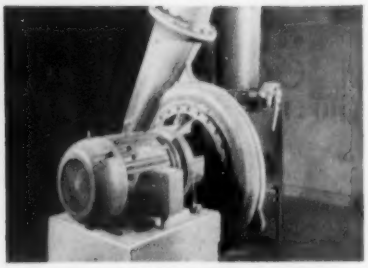


Four-stage motor-driven regenerator air compressor rated 28,000 cfm inlet volume at 26 psig discharge pressure.



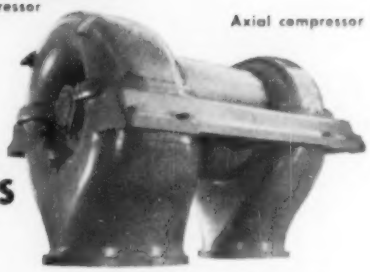
Two-stage sliding vane compressor

Any Volume Any Pressure



Single-stage centrifugal compressor

Axial compressor



Solve every process air or gas need from the most complete line of compressors

Whether you need main blowers, regenerator air, lift air, recycling, or vacuum pumps, Allis-Chalmers builds a type and size unit for the job.

Compressors that have run over two years without stopping have established Allis-Chalmers reputation for reliability in the petroleum industry.

One reason for such performance records is the smooth operation of Allis-Chalmers compressors . . . proof of careful engineering and manufacture. In addition, casings are rugged cast iron or steel, bearings are ample size and easily accessible for inspection and maintenance.

You need uninterrupted service and you get it with Allis-Chalmers compressors.

If motor-driven units are specified, Allis-Chalmers can furnish motors specially designed for petroleum industry applications, together with coordinated control.

CHECK HERE FOR INFORMATION

- ☐ Single-stage sliding vane compressors
- ☐ Two-stage sliding vane compressors
- ☐ Single-stage centrifugal compressors
- ☐ Multi-stage centrifugal compressors
- ☐ Axial compressors

Add name and address in margin and send to your nearby A-C office or Allis-Chalmers, Milwaukee 1, Wis.

ALLIS-CHALMERS A-C

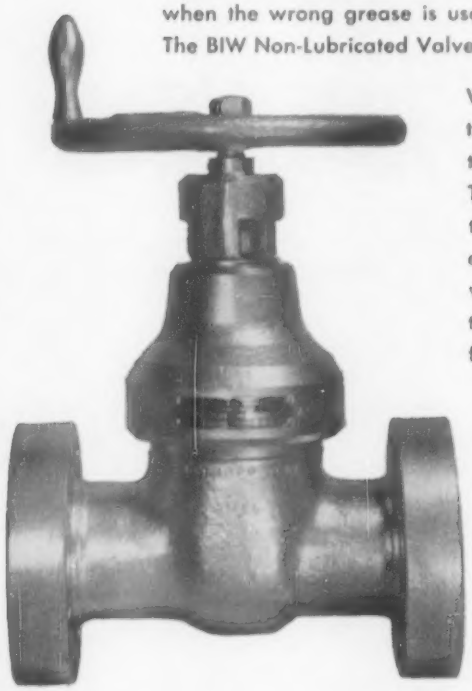
A-4751

WHY PAY TO USE YOUR OWN VALVES ?

BIW Non-Lubricated GATE VALVES

CUT VALVE MAINTENANCE COSTS

You needn't dig into your pocket for more money every time you use a BIW Non-Lubricated Gate Valve. You can use these valves **free.** You are free of the man with the grease gun. Free of an inventory of grease. And free from the problems that come when the wrong grease is used or when greasing is forgotten. The BIW Non-Lubricated Valve makes **economy** a fact.



With the economy of non-lubrication you get the dependability of the simplified, rugged BIW design. The low opening torque required, the effective metal to metal seal, and low maintenance of BIW valves have been proved by more than 35,000 installations in the field.

The BIW Non-Lubricated Gate Valve comes in a full range of sizes and pressures up to 15,000 pounds test pressure! See the BIW engineer today and forget about the problem of lubricating valves.

ALCO

ALCO PRODUCTS, INCORPORATED

Formerly American Locomotive Company
Oil Tool Sales Office—1404 Dunlavy—Houston 19, Texas
Oil Tool Warehouses in Beaumont and Odessa

PARKERSBURG TANKS are TOPS!

. . and here's just a few of the reasons WHY!

● *Combined, these reasons mean you can't buy better tanks than Parkersburgs. They mean, too, you're money ahead on your investment through savings in erection costs and minimum maintenance through years and years of service.*

PRECISION FABRICATION: Every part of Parkersburg Bolted Steel Tanks is precision cut and formed. Bolt holes are die punched in a single operation to assure absolute matching.

THREE-IN-ONE VALVE: The relief valve for both pressure and vacuum also acts as a gauge hole cover. It is spark-proof, has no springs or valve stem to stick or break.

DETERIORATION-PROOF PACKING: Manufactured exclusively for Parkersburg, this packing has twice the strength of other packings—compresses but won't "flow" under pressure—seals securely around bolt holes—has been in service on tanks without leaking for 20 to 25 years.

ERECTION SERVICE: Supplementing the design and fabrication advantages of Parkersburg Bolted Steel Tanks, are the experienced erection crews, which are available for erecting Parkersburg Tanks anywhere. When these skilled, dependable crews put up a Parkersburg Tank, you never have to worry about it holding oil . . . and to be doubly sure, every tank is double checked after erection.

● *There are many, many more reasons why Parkersburg's are your best buy in Bolted Steel Storage Tanks. Ask your nearest Parkersburg Representative.*

Parkersburg
RIG AND REEL COMPANY
DIVISION OF PARKERSBURG : AETNA CORPORATION

3345 WINTHROP AVENUE
FORT WORTH 16, TEXAS

5510

Formerly American Locomotive Company
Oil Tool Sales Office—1404 Dunlavy—Houston 19, Texas
Oil Tool Warehouses in Beaumont and Odessa

Oil field engine takes heavy pulsating loads...*with help of TIMKEN® bearings*

THIS Lufkin Model H-795, two-cylinder, 45-65 horsepower oil field gas engine is designed for use with pumping units, compressors and other applications in the oil fields.

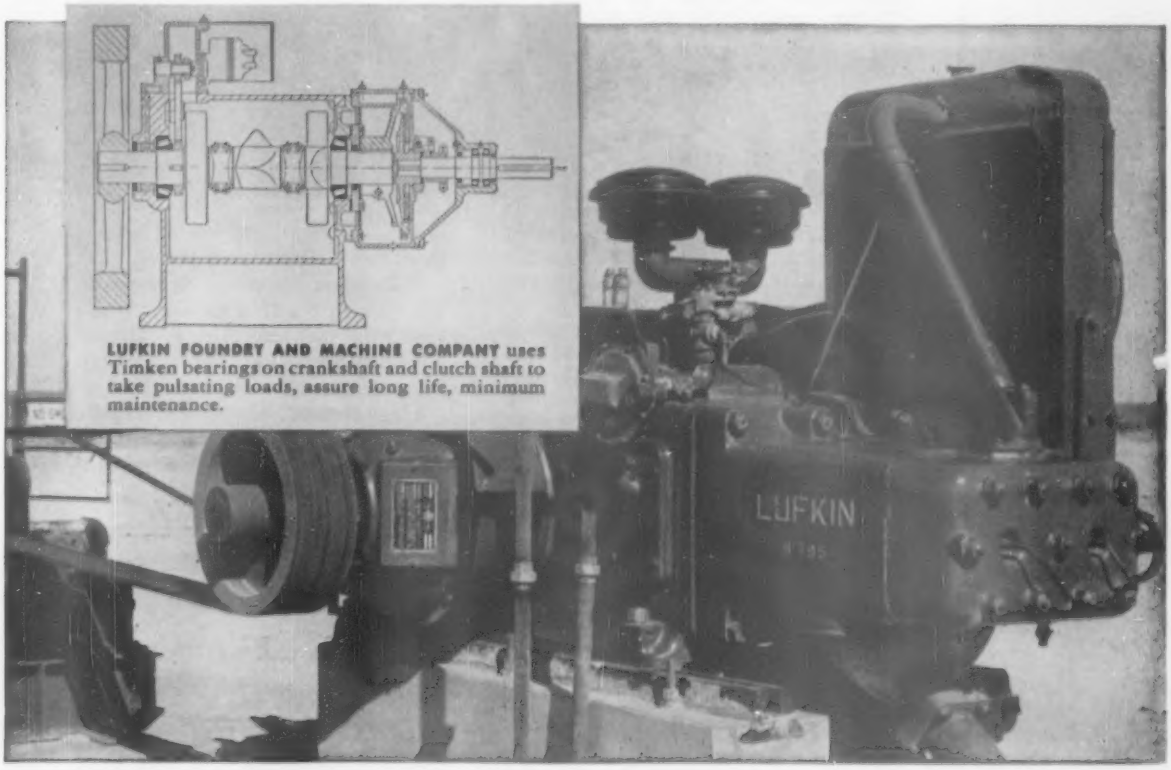
One of the biggest problems in an engine of this type is the ability of the bearings to take heavy pulsating loads. Lufkin engineers solve this by using Timken® bearings on the crankshaft and in the Twin-Disc clutch.

Timken tapered roller bearings are made of the finest steel ever developed for tapered roller bearings—Timken fine alloy steel. In addition, both rollers and races are case-hardened. Thus the tough, inner core of the bearings can absorb heavy load shocks, while hard, wear-resistant surfaces enable the bearings to last the life of the machine under normal operating conditions.

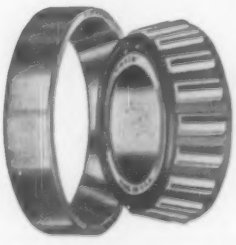
Due to their tapered construction, Timken bearings take both radial and thrust loads in any combination. Full line contact between rollers and races gives extra load-carrying capacity. And because Timken bearings are manufactured to extreme precision limits and finished to incredible smoothness, Timken bearings make friction practically negligible.

When you're building or buying oil field equipment, get all these advantages. Specify Timken tapered roller bearings. Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



LUFKIN FOUNDRY AND MACHINE COMPANY uses Timken bearings on crankshaft and clutch shaft to take pulsating loads, assure long life, minimum maintenance.



TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

OUR OWN NICKEL-RICH ALLOY STEEL MAKES TIMKEN BEARINGS TOUGHER

Nickel makes steel tougher. And we don't skimp on nickel in the fine alloy steel we make for Timken bearings. Our steel-making specialists use the exact amount to give Timken bearings the toughness they need to withstand shock, last longer. We control the quality of Timken bearings at every step in production—from melt shop through final bearing inspection.

NOT JUST A BALL NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION

Adjustable Crank Cabot

CABOT units have a universal base with easily interchangeable extensions to accommodate any prime mover.

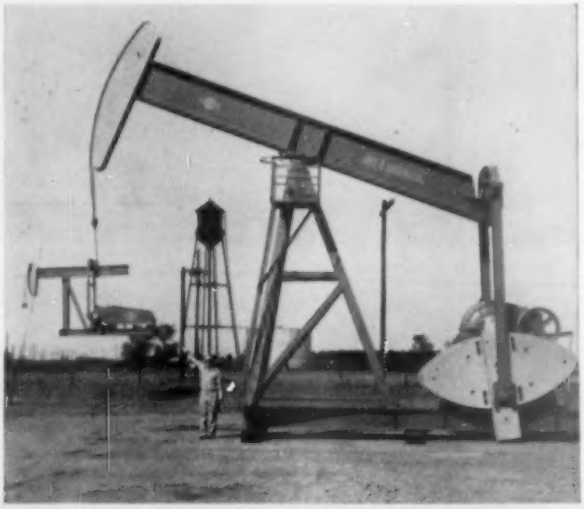
The one-piece reducer case houses the finest gears, shafts and bearings known to the industry. There are no oil seals. The reducer carries a five-year service guarantee that is valuable to the user.

The derrick-type sampson post is made of heavy angles with well-designed bracing members, boxed in at the top with steel plates.

It is never necessary to remove the walking beam to service a well equipped with a CABOT. Clearance has been increased by newly designed horseheads.

Floor-clearing bases, Vee belts, belt guards, reducer oil, and adjustable slide rails are standard equipment.

Here, for comparison, are CABOT'S largest and smallest units. The small unit is from the Beam Balanced Type B Series (limited crank counterweighting optional) rated from 3,000 to 11,000 pounds beam rating.



113 M

Pumping Units

built to serve best the man who owns the well!

Seventeen years ago CABOT engineered a line of pumping units to cut costs and minimize maintenance problems for producers.

CABOT units, built strictly to API standards, sell to the most exacting producers in the United States and Canada.

The Adjustable Crank Type AC series starts with a unit beam rating of 9,000 pounds, and a 40,000 in-lbs. reducer rating. The series includes a unit with a beam rating of 32,000 pounds and a 456,000 in-lbs. reducer rating.

The Adjustable Crank CABOT* is floor clearing and equipped with a rubber tail bearing. This EQUALASTIC© bearing, patented and exclusive with CABOT, is a marked improvement in pumping-unit construction. It eliminates many parts and much maintenance. It does away with lubrication at this awkward point.

Any J&L man will welcome an opportunity to give you more interesting CABOT facts pertinent to production in your field, and detailed specifications.

*except AC-32

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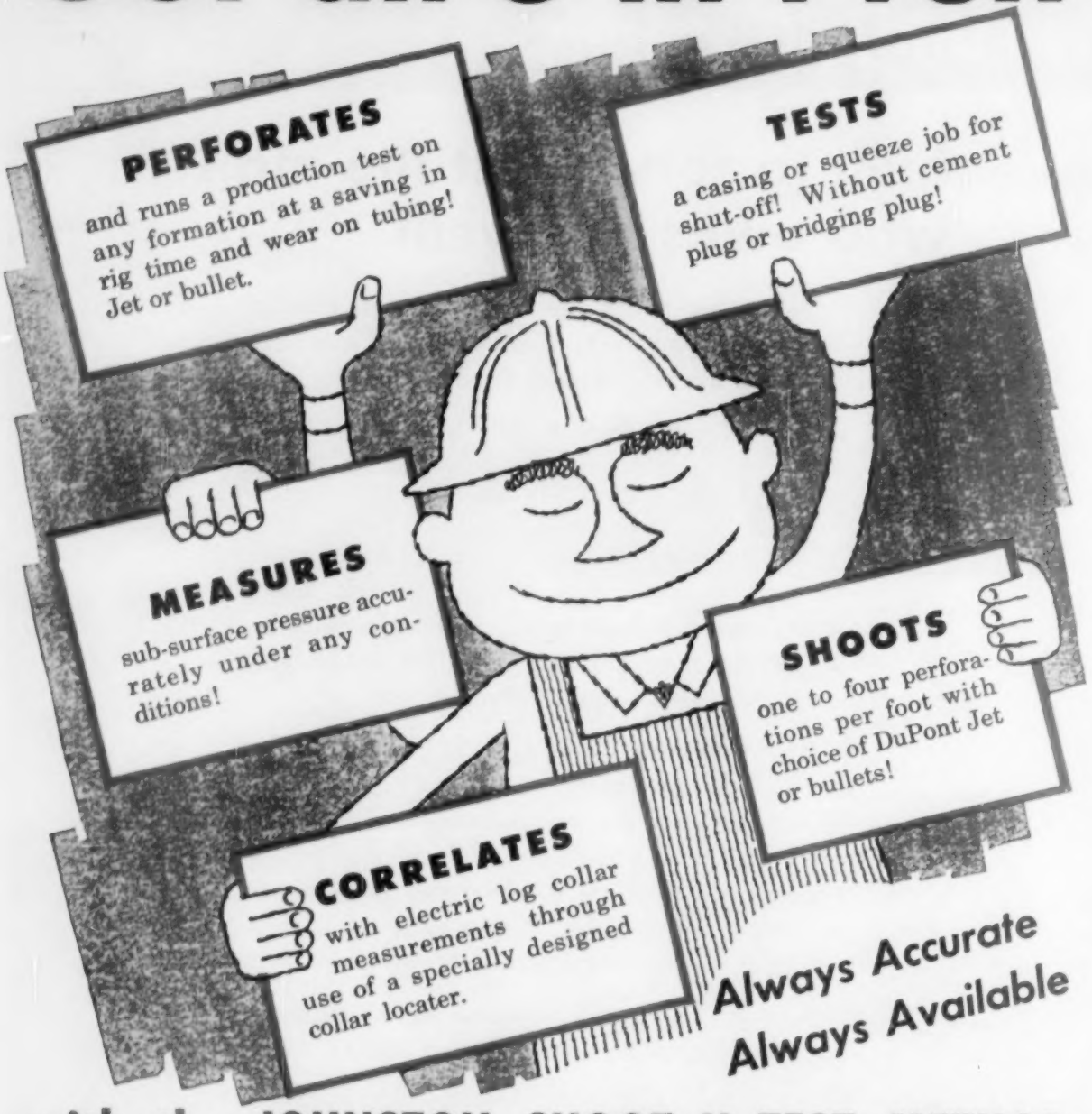
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and runs a production test on any formation at a saving in rig time and wear on tubing! Jet or bullet.
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P551

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Batting .600 in the Repeat Order League

In big league competition, three out of every five Bucyrus-Erie spudders sold go to customers who have used these outstanding rigs before — a truly remarkable success story in itself. The reasons behind the story are even more important.

BIG CAPACITY Each model has plenty of capacity for its range. For instance, the big 48-L swings up to 6,000 pounds of tools, drills top-to-bottom to 6,000 feet. For heavier work, this rig is available with a heavy-duty Tripod Derrick which permits handling static casing loads up to 300,000 pounds.

VERSATILITY With each Bucyrus-Erie model, you can handle top-to-bottom drilling, deepening, drilling-in, workover, tube-and-rod servicing, swabbing, cleanout, etc.

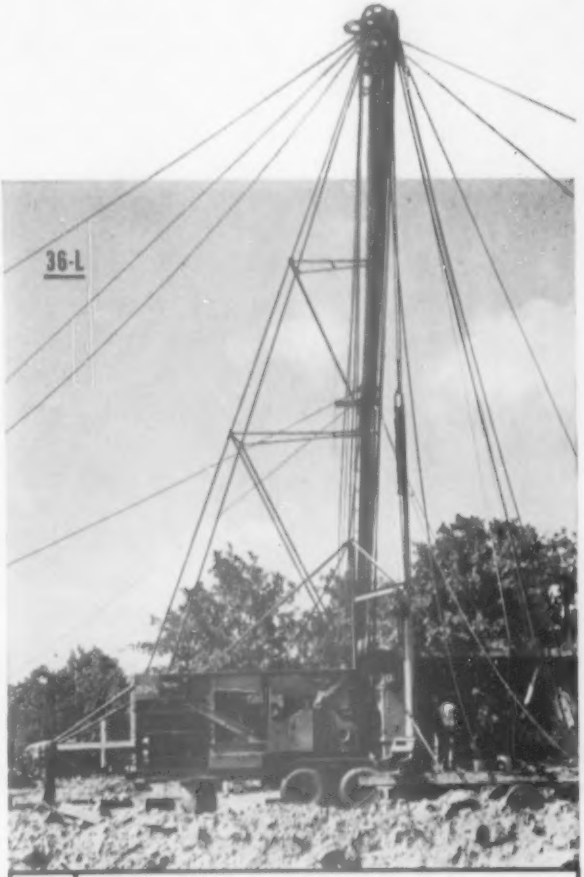
MOBILITY Bucyrus-Erie spudders are particularly noted for fast moves and quick setups. Readying a rig for operation is a matter of hours, not days. You cut lost time to minimum.

LONG LIFE Drilling machinery is held in alignment by an all-steel, electric welded, fully trussed box frame. You get long-life performance . . . low maintenance requirements at minimum cost.

For complete information, see your local Bucyrus-Erie spudder distributor. With all the facts at hand, you'll know why those who use 'em, choose 'em again.

22555

BUCYRUS-ERIE COMPANY
South Milwaukee, Wisconsin



60-L	Top-to-bottom drilling to 1,500 ft.; Servicing to 2,000 ft.; Swings up to 2,750 lbs. of tools.
28-L	Top-to-bottom drilling to 2,500 ft.; Servicing to 3,000 ft.; Swings up to 3,000 lbs. of tools.
36-L	Top-to-bottom drilling to 3,500 ft.; Servicing to 4,000 ft.; Swings up to 4,200 lbs. of tools.
48-L	Top-to-bottom drilling to 6,000 ft.; Servicing to 7,000 ft.; Swings up to 6,000 lbs. of tools.

ABILITY PLUS EXPERIENCE EQUALS SERVICE . . .

28 years of experience solving drilling structure problems — that's the biography of J. R. Roberts, the Lee C. Moore District Manager in Houston. Roberts will make engineering design service available to you for special equipment. This consulting service is important both in special design problems and the application of standard equipment to give you the vast experience of drilling structure specialists.

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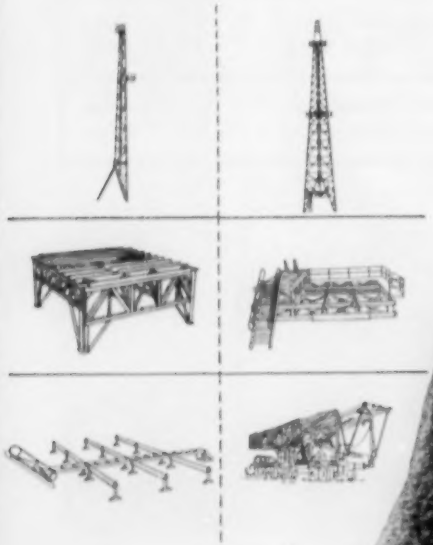

They Say—

Future Canadian Markets

"Much has been said during the past year or more about the prospects of western Canadian crude oil supplying the substantial refinery market in Montreal, where the demand by 1960 is forecast at 205,000 bbl. daily. . . .

"The economic problems involved in implementing such a proposal appear to outweigh by a large margin the apparent advantage to Canadian producers in supplying this remote market. . . .

"We foresee, however, an attractive growth in the Ontario market, although here, too, the competition of other sources of crude is very real and can become formidable. Although no definite projects are known at the present time, it is our conviction that, like our company, our competitors will find it necessary to use western Canadian crude oil exclusively to supply their Ontario petroleum market. This will require the installation of additional refining capacity in Ontario and could result in the extension of the Interprovincial pipeline system to the Toronto area. Our forecast assumes the elimination of Ontario imports of foreign crude oil by 1958 and the installation of adequate refining capacity . . . On this basis the Ontario market will increase from 107,000 bbl. daily in 1955 to 187,000 bbl. daily by 1960.

"In reaching Ontario the Interprovincial line runs through a potential market in Michigan and it is not too great a jump from Sarnia to the large markets in Detroit and Toledo. We have studied the possibility of marketing Canadian crude in these areas and regret to say that the prospects of supplying significant volumes of western Canadian crude oil to refiners in this area in the near future seem remote, although favorable in the long run. . . .

Fred G. Cottle, manager of the transportation and supply department, Imperial Oil, Ltd., in an address in Edmonton before the Canadian Institute of Mining and Metallurgy.

A.P.I. President Speaks

"With the large excess productive capacity in the United States, the question of the proper level of oil imports has become an acute issue . . . It is my earnest hope that increased demand both here and abroad, together with enlightened self-interest on the part of all concerned will be the answer . . .

"The exploration for and the producing of natural gas does not lend

an ACCO product

Helicoid Gages

For day-in, day-out Sustained Accuracy
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HELICOID Quality
costs you less!

• It's the basic design of HELICOID Gages that makes them outlast and out-perform ordinary gear-tooth gages. This enduring accuracy is evidenced by the smooth rotation of simple spiral roller and cam.

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"As the twig was bent"...

Some 35 years ago the Wilson Supply Company opened its doors to serve a growing Oil Industry.

Its most important asset was a desire and determination to give the Driller and Producer "what they wanted—when they wanted it," in supplies and equipment of proven quality.

That policy has been responsible for its continuous growth. Branch stores have been advantageously located to best serve the Oil & Gas Industry.

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HOUSTON, TEXAS

itself to utility regulation. Price fixing of a commodity in peacetime is unthinkable in a free country. Beyond all other, the fundamental issue is our inherent right to sell our commodity in a free market for which there is no substitute . . . "

Frank M. Porter, president, American Petroleum Institute, in an address in Pittsburgh before the eastern district, Division of Production of the A.P.I.

Type of Leaders Needed

"We need leaders with common sense and cold logic, leaders with the intellectual honesty to face facts . . . Leadership is not an easy role, either in business or in any activity. Leadership calls not only for initiative, it calls also for broad perspective, and broad perspective in these times is hard to achieve.

"This is the age of the specialist. The larger the over-all scientific knowledge accumulated, the smaller the portion that any one individual is able to grasp. In the Du Pont company, for example, we have some 200 different kinds of engineers. We have a hundred or so different kinds of scientists . . . Even the law is becoming subdivided into diverse patterns, some unknown half a century ago . . . Undoubtedly this trend will continue, for it is based on the simple strategy of cutting up the problems into pieces and dealing with them in detail.

"In following out this practice, however, we run the risk of not seeing the forest for the trees. Leadership requires the capacity of seeing the whole picture and of consolidating the various details that make up the whole . . ."

Henry B. du Pont, vice president, E. I. du Pont de Nemours & Co., in an address in Wilmington before a group of engineers visiting the company.

Smog Future Smoggy

"Possibilities of controlling smog have been so oversimplified in the minds of many people that millions of residents of the Los Angeles Basin have been led to expect quick and easy victory. Such great expectations definitely are not warranted in the light of our current knowledge.

"Our team of researchers . . . has made important strides in licking the smog problem by assisting in developing a whole series of new 'tools,' but these adaptations and inventions do not spell the end of smog . . . We must 'make haste slowly.'

"Much as I regret to dampen the hope of both the public generally and the foundation's own backers and contributors, I must say that I cannot see any very appreciable reduction in

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lift loads from any depth.....

WITH THE TYPE 'L'

Finest Tubing Swab Cup Made For Lifting Heavy or Light Loads

When you're swabbing from any depth or want to unload the well completely, you can do a better, more efficient job with the Guiberson Type L on the the regular Guiberson Swab. This unbeatable combination drops fast and seals perfectly for the lift — and has the flexibility and durability to do a top-notch job. Capable of lifting heavy loads, this versatile cup will also lift the last light loads from the bottom of the well. The L lifts *full* loads, not just part way but all the way to the surface, slipping by collars just as though they weren't there. The next time you need a a general purpose swab cup, get the Type L. Look for it at any supply store, packaged in pairs in the brilliant blue box.

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GUIBERSON
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ESTABLISHED 1919 • DALLAS, TEXAS, U. S. A.
Sold By Leading Oil Field Supply Stores Everywhere

smog in sight this summer or next. This is the simple, inescapable truth, and I would be gravely amiss in my duty not to make these facts clear before the 1955 so-called 'smog season' is upon us . . ."

Dr. W. L. Faith, vice president, Air Pollution Foundation, in a statement released in Los Angeles.

Where Exploration Is Pushed

"The most important single factor of higher expense was a substantial increase in finding costs to develop new sources of crude oil. It has been apparent for some time that opportunities for finding new oil in our traditional producing areas—Texas and the Mid-Continent—would become increasingly limited, and that we should not depend on increases in production from those areas to keep up with rising refinery requirements . . .

"Our domestic crude production in the first quarter of this year was only about 1 per cent higher than last year, whereas refinery runs were about 14 per cent higher.

"Our modest Venezuelan production showed a much better percentage increase over last year, so that our total production was up 2.2 per cent. Nevertheless, by far the greatest part of our total production will continue to be in the U.S.

"We are now emphasizing our finding efforts in the 'Frontier' areas—the Rocky Mountains, the Williston basin, and particularly the offshore areas of the Gulf of Mexico. The immediate result of operating in such frontier areas is to place a heavy charge against earnings, with limited additions to revenue. For the longer term, however, we are quite confident that the rewards will be worthwhile, and will fully justify the current high level of expense . . ."

Henderson Supple, Jr., president, Atlantic Refining Co., at the company's annual meeting.

CALENDAR OF EVENTS

MAY

30-June 1 Chemical Institute of Canada, thirty-eighth annual conference and exhibition, Quebec City, Que.

JUNE

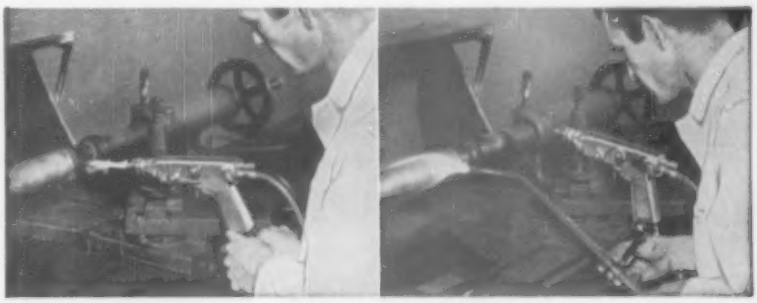
1-3 Tenth annual Short Course on Gas Technology, Texas College of Arts and Industries, Kingsville, Tex.

5-9 Canadian Gas Association, annual meeting, Sheraton-Broeck Hotel, Niagara Falls, Ont.

6-9 Oil and Gas Power Division, American Society of Mechanical Engineers, 27th

Fight Pump Wear with Colmonoy SPRAYWELDING

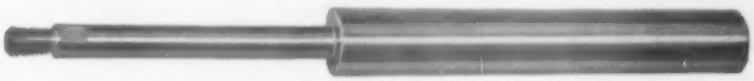
COLMONOY hard-facing protects against corrosion and abrasion . . . makes pump plungers, pistons, rings, bushings, any pump part last longer. The Sprayweld Process eliminates time consuming hand application and warpage, and it allows complete control over the smooth application of the alloy in powder form.



Spray it . . . Fuse it

The COLMONOY Spraywelder applies COLMONOY alloys to the wear areas of any metal part. The sprayed overlay is then welded to the base metal by fusing it with an oxy-acetylene torch. The even application makes the removal of more than .010" per side in finishing very rare.

A COLMONOY Sprayweld surface is non-porous, non-sparking, and has a low coefficient of friction. It resists corrosion, abrasion, and oxidation.



This acid sludge pump plunger was being repacked every 8 hours, and replaced every 24. At half the cost of new plungers, Spraywelding with COLMONOY *No. 6 stretched repacking intervals to 60 hours, and increased total life to 573 hours.*

Write today for the new catalog describing the Model C Spraywelder.

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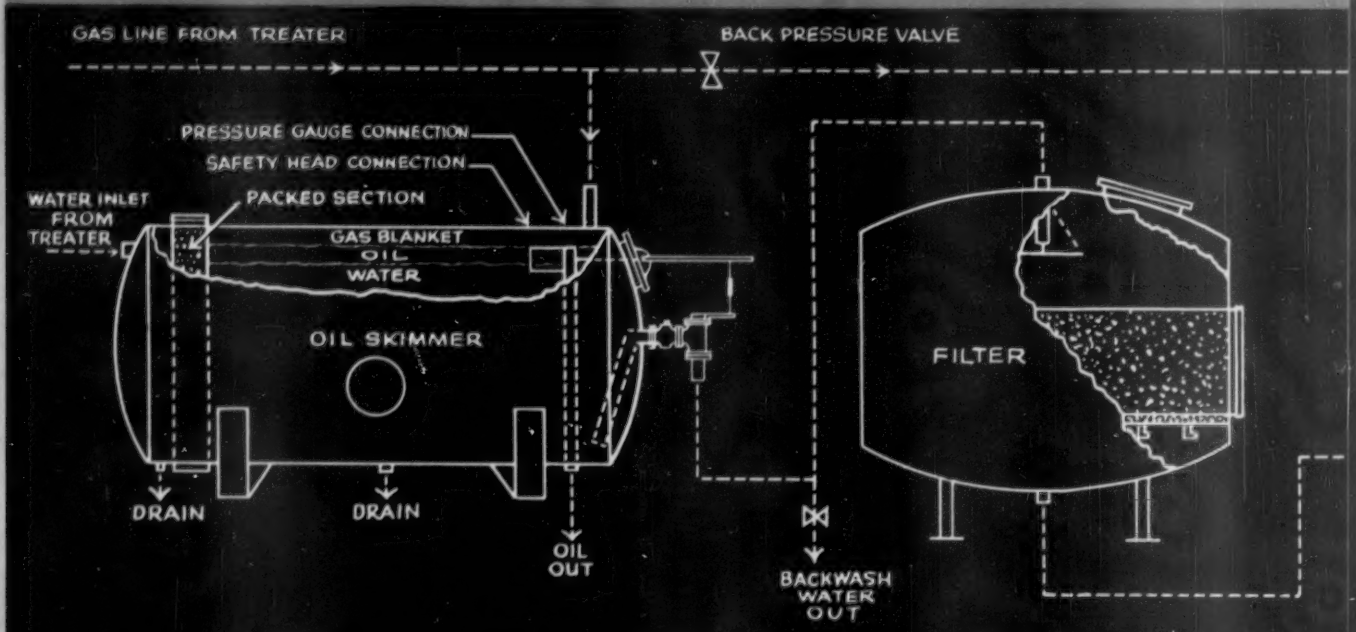
For The Preconditioning Of Subsurface



FLOW DIAGRAM OF BS&B AQUA-KLEENER SYSTEM

There Is No Better Equipment Than BS&B

Conditions under which water conditioning and filtering systems must operate vary widely from one water flood project to the next. The degree of water treatment required will depend on the condition of the produced water and the characteristics of the formation into which the water is to be injected. That is why the new BS&B AQUA-KLEENER is today's *outstanding* water conditioning and filtering system for use on water flood projects!

AQUA-KLEENER is a closed type system which prevents air from contacting the water —thereby minimizing corrosion, excluding air-borne bacteria and preventing the oxidation of such substances as soluble iron.

The AQUA-KLEENER System consists basically of a primary separating unit, an oil skimmer, separate filter and backwash water tank (or a combination of the two), and auxiliary controls and equipment. Its *design flexibility* enables you to use it as a complete water conditioning system—or to employ only parts of it to augment an existing installation.

The "heart" of the AQUA-KLEENER System is an improved type filter using porous aluminum oxide underdrain plates under a filter bed of Anthrafilt No. 1. In comparative tests, this type of filter has been found to be greatly superior to the graded bed filters of sand and gravel commonly used in other systems, as shown by the following:

EFFICIENCY
OVER 60 YEARS
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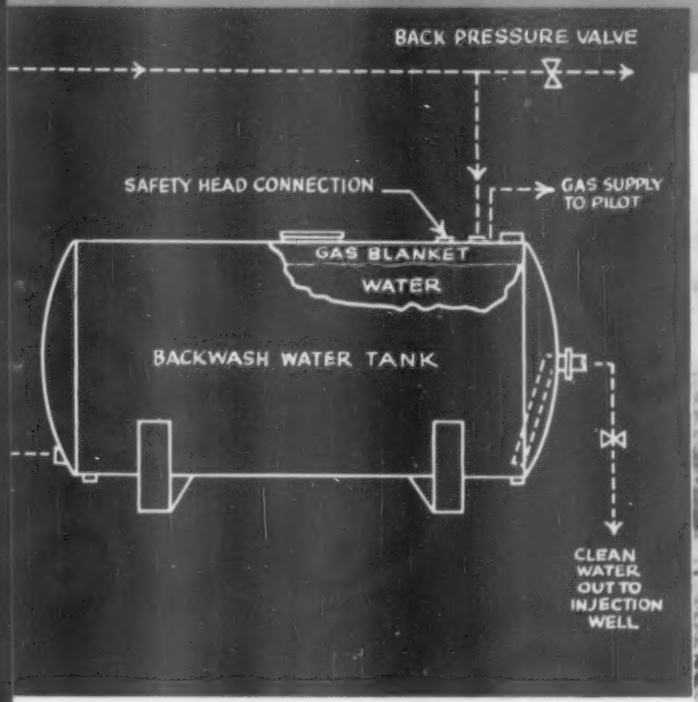
BLACK, SIVALLS

Oil & Gas Equipment Division, Dept. 1-A5A

Injection Water On Water Flood Projects...



AQUA-Kleener!*

- Filter runs are longer before backwashing is necessary.
- Only half as much backwash water is required for cleaning.
- Filter material weighs approximately one-half as much.
- Filter material does not react with alkaline water, algae, bacteria or such dissolved substances as soluble iron.
- Filter bed does not pack as tightly, therefore resulting in a lower pressure drop.
- Higher porosity and greater surface area of filter material results in more efficient removal of turbidity and bacteria.

If you'd like more detailed information on the new BS&B AQUA-KLEENER System, contact your nearest BS&B Representative — or write to us direct.

* AQUA-KLEENER is a trade name of Black, Sivalls & Bryson, Inc.

Photo shows BS&B AQUA-KLEENER System with oil skimmer at left, "Filta-Wash" (combination filter and backwash water tank) in center, and storage tanks at right. Pump house is in the background.

& BRYSON, INC.

1708 West Main Street Oklahoma City, Oklahoma

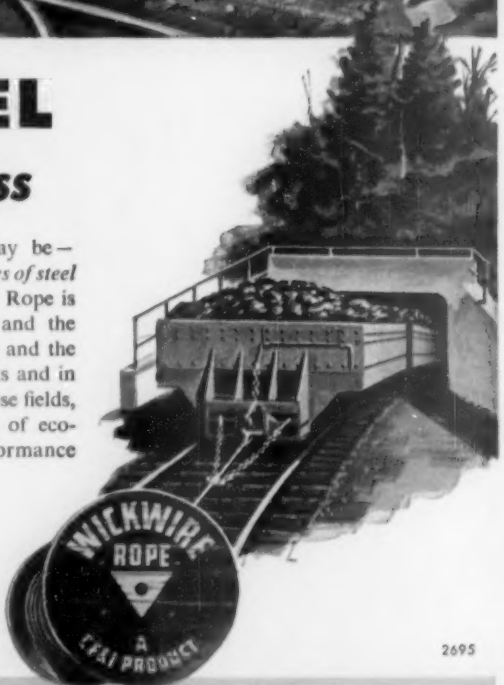
MUSCLES OF STEEL

put the mules out of business

Oldtimers in coal mining can remember when mule-power was the only means of transportation in the mines.

Today's efficient coal mining demands big-capacity mechanized equipment. In modern underground mines, wire rope serves as *muscles of steel*—pulling cars from the loader to discharge point. In strip mining, also, wire rope provides the *muscle* for huge stripping shovels.

No matter what the job may be—wherever there's need for *muscles of steel*—it's a safe bet that Wickwire Rope is busy at work. In the mines and the quarries. In the logging camps and the oil fields. With the fishing fleets and in materials handling. In all of these fields, Wickwire Rope has a record of economical and dependable performance that can't be beat.



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annual conference and engineering exhibit, Hotel Statler, Washington, D. C.

6-10 American Petroleum Institute, Division of Production, midyear committee conference, Brown Palace Hotel, Denver.

6-15 Fourth World Petroleum Congress, Rome, Italy.

7-9 National Oil Scouts and Landmen's Association, 32nd annual meeting, Banff Springs Hotel, Banff, Alberta, Canada.

9-10 Natural Gas and Petroleum Association of Canada, Royal Connaught Hotel, Hamilton, Ont.

9-10 Pennsylvania Grade Crude Oil Association, annual meeting, Hotel William Penn, Pittsburgh.

11-15 Petroleum Equipment Suppliers Association, annual meeting, Banff Springs Hotel, Banff, Alberta, Canada.

12-17 Society of Automotive Engineers, golden anniversary summer meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

16-18 Interstate Oil Compact Commission, Cosmopolitan Hotel, Denver.

17 Northern California Section, American Institute of Chemical Engineers, symposium on waste disposal, University of California, Berkeley, Calif.

20-23 American Society of Mechanical Engineers, semiannual meeting, Statler Hotel, Boston.

23-24 Western Petroleum Refiners Association, technical-industrial relations meeting, Broadview Hotel, Wichita, Kans.

23-26 Rocky Mountain Oil Show, Casper, Wyo.

26-July 1 American Society for Testing Materials, Chalfonte-Hadden Hall, Atlantic City, N. J.

JULY

20-22 Instituto Tecnologico y de Estudios Superiores de Monterrey, first annual short course on instrumentation for industry, campus, Monterrey, N. L., Mexico.

AUGUST

15-17 Society of Automotive Engineers, golden anniversary West Coast meeting, Hotel Multnomah, Portland, Ore.

29-31 15th annual Appalachian Gas Measurement Short Course, West Virginia University, Morgantown, W. Va.

26-Sept. 15 Graduate summer session in reservoir engineering, University of Texas, Austin.

SEPTEMBER

11-13 Independent Natural Gas Association of America, annual meeting, Jasper Park Lodge, Jasper Park, Jasper, Alberta, Canada.

12-14 American Institute of Electrical Engineers, electrical conference of the petroleum industry, Shamrock Hotel, Houston.

13-24 First International Instrument Congress and Exposition, and ninth National Instrument Conference and Exhibit, Philadelphia.

14-16 National Petroleum Association, 53rd annual meeting, Traymore Hotel, Atlantic City, N. J.

22-23 Western Petroleum Refiners Association, regional technical-industrial relations meeting, Hotel Henning, Casper, Wyo.

22-23 Louisiana - Arkansas Division, Mid-Continent Oil and Gas Association, annual membership meeting, Roosevelt Hotel, New Orleans.

26-28 American Association of Oilwell Drilling Contractors, fifteenth annual meeting, Rice Hotel, Houston.

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***The one-piece flued dome saddle was designed and pioneered by General American as early as 1938.*

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Member
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JOURNALLY SPEAKING...

Gospel

THIS makes it official. The merger of Sunray Oil Corp. and Mid-Continent Petroleum Corp. was formally sealed at a "wedding" at the Tulsa Chamber of Commerce on Friday the thirteenth where "Miss Mid-Continent" and "Mr. Sunray" plighted their troth and vowed eternal bliss.

And, as this actual, unretouched photograph plainly shows, the "preacher" tied the knot on the "Oil Man's Bible." This was entirely natural, proper, and right, for both participants in this nuptial event were brought up at their mother's knee by reading the Big Yellow Book, for 53 years the guide, teacher, and counselor of oil men everywhere, published every Monday at Tulsa, Okla., at $4 per year. Send check or money order today to P. O. Box 1260.

Motif

THE Journal has other unusual uses, too. Wallpaper, for example.

A prominent Texas oil man papered the big lounge room in his ranch house with Journal wall maps. Just about cleaned us out of back copies of all maps we've printed in the past 10 years.

He explained that he entertains a great many other oil men at his ranch, and he wants his guests to feel relaxed and at home in familiar surroundings, and what could be more familiar and appropriate for an oil man's relaxation than a decor of Journal maps?

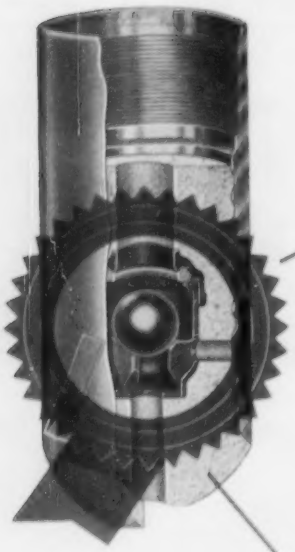
We haven't seen the room, but we can conjure up the scene. A dozen petroleum tycoons—hearty, hard-bitten, decisive men all—spend the day hunting, fishing, or riding, wrap themselves around a huge barbecue of prime Texas beef, and then settle down in the club room for an evening of small talk over a bottle of sarsaparilla.

Eyes inevitably roam to the maps. The talk shifts to oil. Someone mentions a property or a project, and spots its location on the wall. Someone else has an interest nearby. A third man has an idea for a joint operation. Before the evening is over, a deal has been made and agreed to over a second bottle of sarsaparilla. All because of those maps. There's motive in the motif.

So, you see, our favorite oil publication is in on oil "courtships" as well as oil "weddings."

—*Henry D. Ralph.*

Through the years...
today and for many tomorrows...



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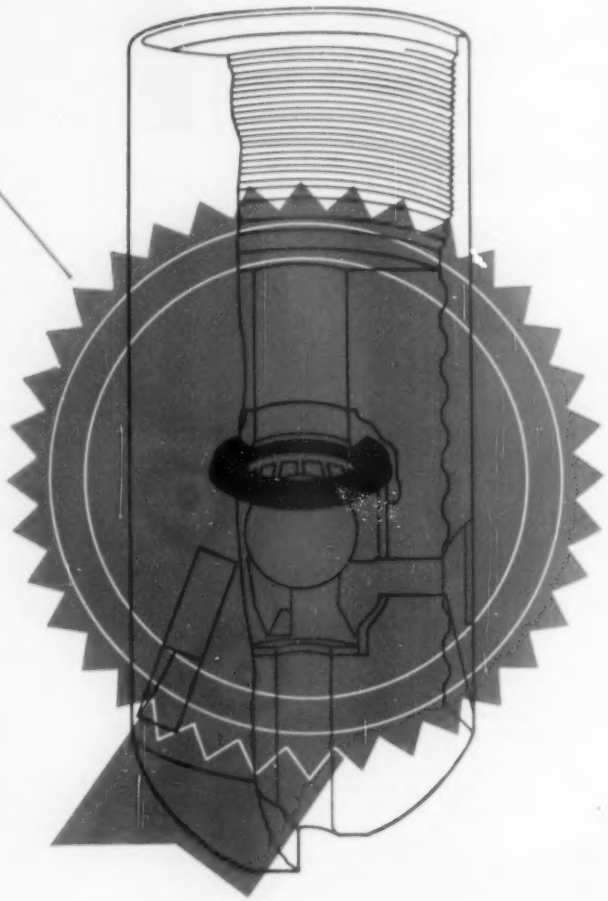


BAKER OIL TOOLS, INC.
HOUSTON • LOS ANGELES • NEW YORK

Education for Oil

NEXT month, as every June, thousands of young college graduates leave the campuses and enter the ranks of the oil and gas industry. It is a good time to examine the relationship between the industry and education.

For only about a generation has the petroleum industry leaned heavily on technically trained men, but now its appetite for them seems insatiable. It therefore has a big stake in seeing that the nation's educational system turns out the type of graduates it needs.

AS TO CURRICULUM, there is a mild controversy over whether technical schools should produce specialists through extensive use of "practical" courses, or whether they should prepare youths for executive positions through more attention to the humanities plus a broad background in general science and the scientific approach to solving problems.

This controversy may never be ended. Some companies want ready-made specialists and technicians. Others prefer to give their own practical training to young graduates. But in any case, employers should inform the colleges how their graduates are doing, what types of training have proved most valuable, and how the curriculum should be pointed in the future.

ON THE FINANCIAL SIDE, some individual oil men and companies have contributed generously to scholarships, fellowships, endowments, and other aids. But the contribution of the industry as a whole is small compared with the benefits received.

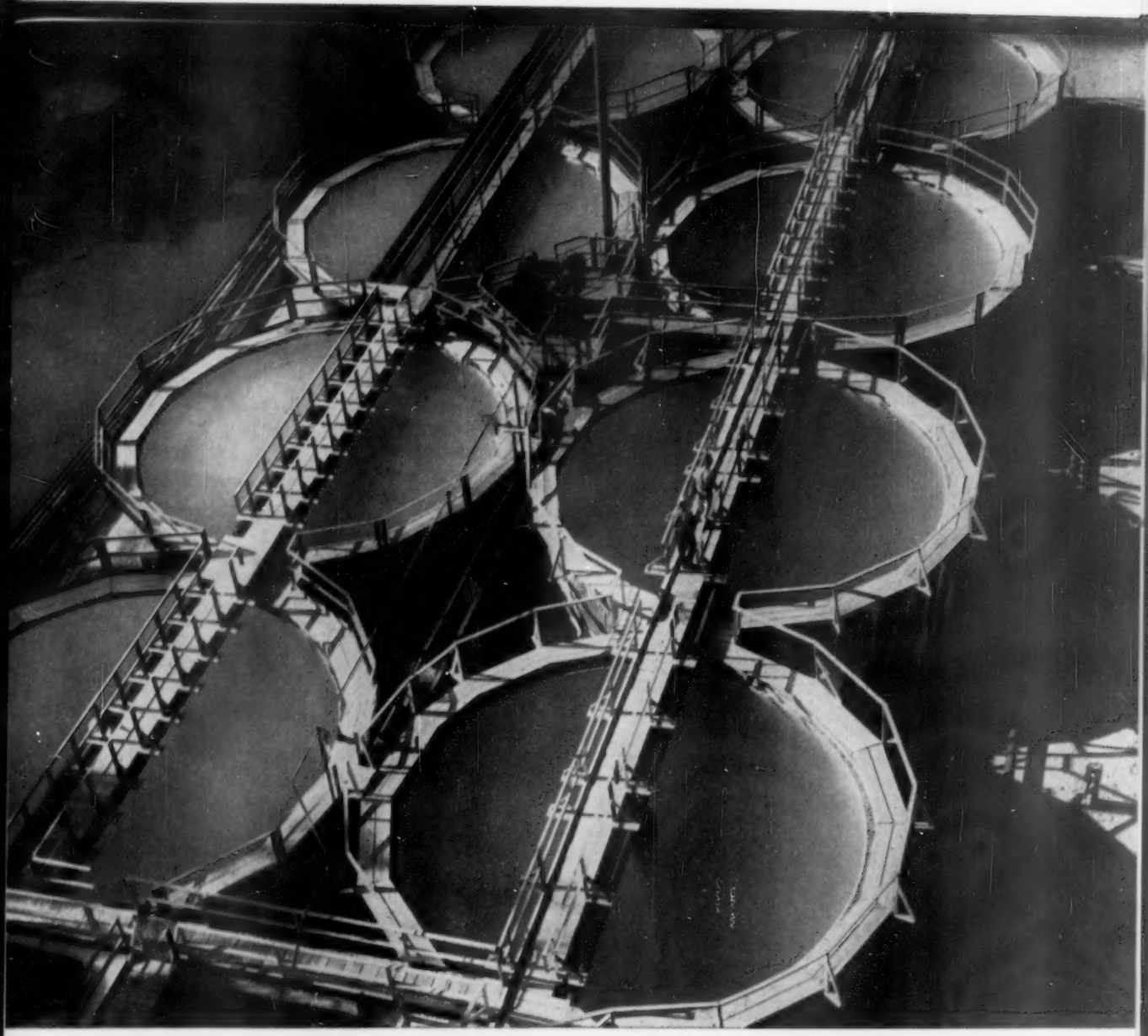
Because competition among industries for engineers is so great, and because petroleum depends so much on technically trained men for its future progress, the industry has a selfish reason for financing the type of education it requires.

But also the industry has the obligation of a good citizen to give financial support to higher education in general. It depends not only on scientists but also on a rising generation of men adequately trained in law, economics, business administration, and other branches of learning.

Furthermore, the continuance of our system of private enterprise, to which the oil industry owes its existence, depends on the sort of teaching given students who will never enter the oil and gas business. More and more, this industry is learning that its problem of good public relations begins in the schools.

THE LEADERS OF THE INDUSTRY a few years hence are now on the campuses of the nation. What sort of leaders they will be and how they will direct the course of this great industry depends in large measure on what they are learning currently.

Today's oil men can determine the type of their successors by taking an active interest in facilities and the attitudes of our educational system.



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THIS WEEK . . . . . IN THE NEWS

International

• America's five major international oil companies no longer have the foreign field to themselves. Independent American operators in increasing numbers are stepping into wildcat explorations abroad. At least 60 have been tabulated, with many more looking around in one spot or another. Look for this trend to be stepped up with Libya, Turkey, Italy, Colombia, and other areas becoming ripe for oil development.

• Western oil companies may reenter Austria. The treaty under which Austria regained its oil properties from Russia forbids ownership by foreigners. But it makes no mention of foreign operation. Austrian officials appear favorable to development by foreign capital. Tip-off of trend may be concession granted Shell in western Austria last month.

Imports

• Crude imports are continuing to mount. The major importing companies, in reports to the Texas Railroad Commission, indicate the flow of foreign crude into the U. S. will reach an all-time high in June. They reported that they plan to bring in crude at the rate of 773,800 bbl. daily. This total would be 25 per cent higher than actual imports by companies reporting to the commission for the same month last year. It also would be 7.3 per cent greater than their actual imports in March, when total crude receipts as reported by the Census Bureau set a new record.

Industry

• Oil consumption will double in next 2 decades, Jersey's Eugene Holman predicts. Holman believes U. S. demand will rise 60 per cent, Latin America's will triple, and western Europe will need 2,000,000 bbl. daily more than now in 20 years.

• Purchase of 96 per cent of stock of Bay Petroleum is confirmed by Stone & Webster Securities and Springbank Oil & Gas. Purchase price is over $20,000,000.

Pipelines

• Construction of an all-Canadian pipeline to move Alberta gas to eastern markets may be delayed in favor of a line through the U. S. Plans now being discussed would involve a two-way exchange of gas between Trans-Canada Pipe Lines and Tennessee Gas Transmission Co. The new plan reportedly has the backing of at least one high official of the Canadian Government, which previously insisted on the all-Canadian route.

• Pacific Northwest Pipeline seeks permit to import Canadian natural gas for West Coast markets, along with FPC permit for transmission line. The company plans to tap the Westcoast Transmission line at the international border.

Refining

• The East Coast may soon get a new 30,000-bbl. refinery. Commerce Oil Refining Corp., a new firm, proposes to build the plant near Portsmouth, R. I. A final decision to build has not been made.

Natural Gas

• First floor test for the much-disputed Harris bill is approaching in the House. As redrafted by committee, the measure exempts producers from most federal price regulations. The Federal Power Commission, however, still may hold price increases to "reasonable market price" in the field when new contracts or agreements with certain escalation clauses are involved.

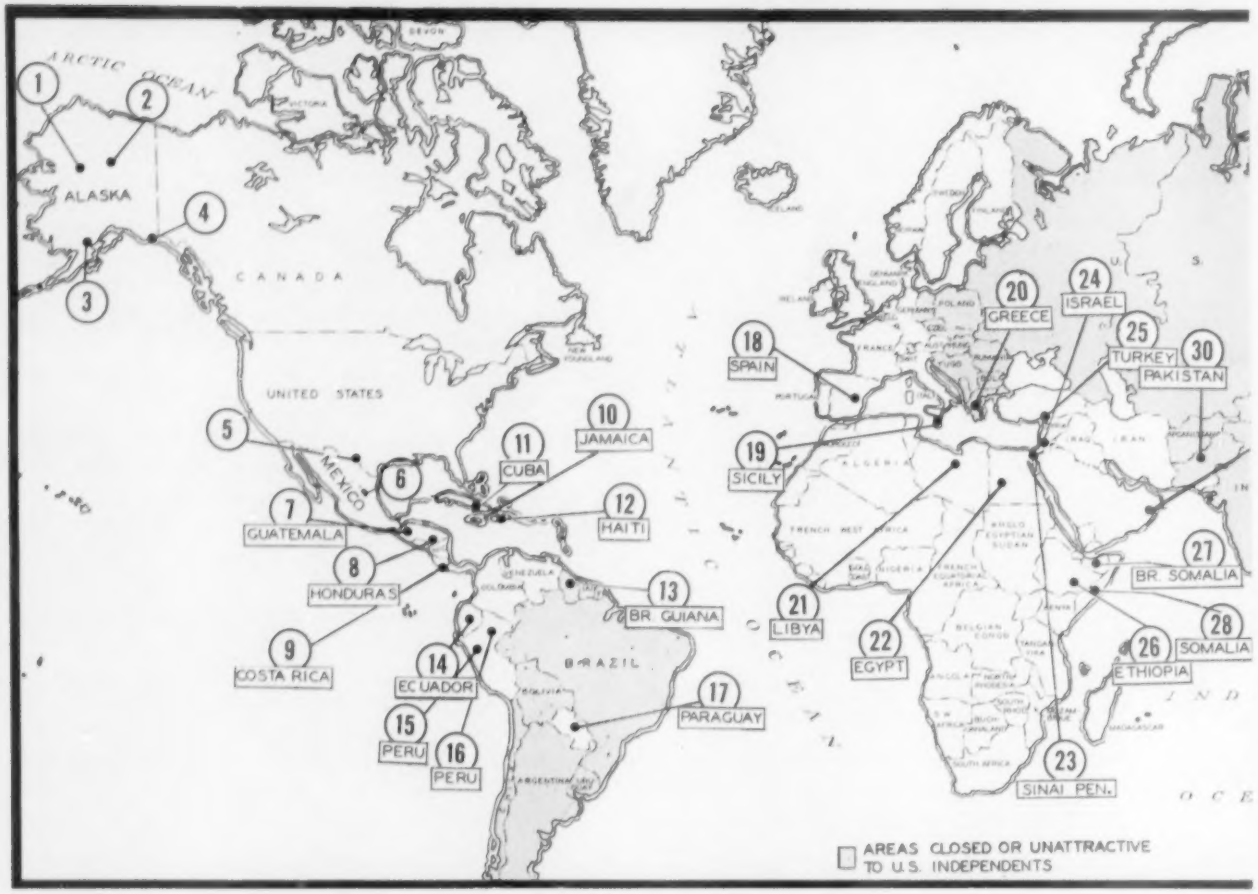
Offshore

• The U. S.-Louisiana dispute over Louisiana's tidelands boundary may be solved soon, or it may drag out until fall. Louisiana officials in Washington last week indicated they might accept a compromise. But if they can't work out something with federal officials, they're ready for a court fight. The U. S. has asked the Supreme Court to set the state's boundary at 3 miles from the coast. The court is expected to adjourn within a few days and probably won't hear the issue until October.

• California's tidelands will become one of the leading exploration centers in the nation if present legislation is passed. The new bill, which looks as if it will become law during the current legislative term, is not all the industry wants, but it removes some of the legal shackles that have withheld full-scale development off the state's coast.

Production

• The bloom is off California's Huntington Beach drilling spree. The pool is believed definitely defined now by the 200 wells sunk in the 85-acre field. Some initial wells which came in for 1,000-bbl. daily have dropped to 60 bbl. by pumping. Probably less than a dozen have paid out. Observers estimate the over-drilling and quick depletion represent an economic loss exceeding $12 million.



More Independents Are Going

Dahl M. Duff

THE lure of foreign operations is becoming an irresistible call for more and more smaller American companies.

Independent operators in increasing numbers appear willing to take a fling at oil finding outside the United States. The programs now under way are scattered throughout both hemispheres. They range from fairly obvious promotional ventures on up to serious and well-financed efforts to develop new production.

Most of these operations are spotted on the accompanying map. What is shown are the foreign exploratory ventures by U. S. and Canadian companies other than the five dominant U. S. international oil companies—Standard Oil Co. (N.J.), Socony Mobil Oil Co., Standard Oil Co. of California, The Texas Co., and Gulf Oil Corp.

The independents operate largely in pure wildcat territory. That's about all left for them. Many countries are legally closed. Concessions in others are already taken or not available. Costs of operation in many areas are too high for the average independent.

So the wildcat territory is an open attraction to many of the smaller independents. In a sense, they are fulfilling their usual role of playing the long-shot bets in oil exploration.

Activity surprising . . . The list with the map gives the names of around 60 such American companies. Many more are probably involved considering the various unknown minority interests. Besides, this tabulation does not reflect the smaller companies which are "just looking" in one place or another. They are checking prospects without having as yet definitely pinned down a concession.

The number and widespread nature of these foreign exploratory efforts by so-called independent companies are surprising. This is especially true when considered against the fact that in a large part of the world foreign oil capital of any kind is either prohibited or not welcomed. Countries in this classification block out much of Latin America as well as the Eastern Hemisphere.

Further narrowing down the available foreign exploration territory is still another group of countries where for one reason or another concessions are not now available. Virtually all the Persian Gulf falls into this category, since the present operators hold exclusive rights over the different countries. Venezuela also is included since it has followed a policy of no new acreage grants for the last 10 years. France in general favors French companies, and foreign operators have long been wary of entering Italy because of a deficient oil law.

There have always been a few independents working outside the United States—for example, Benedum-Trees, who discovered De Mares field in Colombia in 1917, and the many oldtimers in Mexico prior to the 1938 expropriation. But traditionally foreign operations have been a field for big companies and big money. This is prob-

Abroad

ably even more true today because good acreage comes at a high price. Operations usually require considerable side expense, such as for lawyers, government-relations experts, transportation, etc.

Also, just as in the United States, the better prospects in the more accessible locations already have been picked over. For example, in Peru, the best chances for big production seem to lie in the trans-Andean Montana. This is a tremendously expensive jungle operation thousands of miles upriver from the mouth of the Amazon or over a difficult mountain range from the west.

Bear in mind that the map does not show all the American operations abroad. A great many exploratory ventures are under way by the five major companies and their subsidiaries. A lot of it lies in what some geologists consider second-rate territory. But these are the companies with tremendous capital resources and also the market-

(Continued on page 48)

Where Domestic Companies Are Active

The following list, keyed to the map, shows foreign exploratory programs by U. S. and Canadian companies other than the five major international firms—Jersey Standard, Socony Mobil, Texaco, Standard of California, and Gulf. Canada is considered on the same basis as domestic operations. An indication of the status of the program is given below where such information is known.

ALASKA

1. F. Kirk Johnson, Dallas, and Brooks-Scanlon Oil Co., Minneapolis, lease options.
2. Fairbanks Oil & Gas Co., Inc., representing Alaskan businessmen.
3. In this general area are:

Havenstrite Oil Co., Los Angeles, recent drilling.

Union Oil Co. of California and Ohio Oil Co., options.

Alaskan Oil & Gas Development Co., representing Alaskan businessmen, recent drilling.

4. Phillips Petroleum Co. and Kerr-McGee Oil Industries, Inc., drilling.

LATIN AMERICA

5. E. W. Pauley, California operator, exploratory work and development drilling.
6. Isthmus Development Co., Amarillo.

Sharmex Oil Co. (Sharples Oil Co., Denver).

7. Several companies have checked Guatemala's prospects or taken out reconnaissance permits in anticipation of passage of a full-fledged petroleum law. Other than the majors, they include:

Conorada Petroleum Corp.

Union Oil Co. of California.

Houston Oil Co. of Texas.

Clint Murchison, Dallas operator.

8. Cia. Petrolera Hondurena, representing Texas investors, recently granted concession.
9. Union Oil Co. of California, drilling.
10. Base Metals Corp., Toronto, drilling.
11. A number of independents, as well as several major companies, are active in Cuba. Among them are:

Kerr-McGee, with an interest in Corp. General de Petroleo, development drilling in Echevarria field.

Cuban Canadian Petroleum Co., (American Leduc Petroleum Co., Edmonton) development drilling.

Petroleos Aurrera and Minera Movima, S.A., drilling acreage on which Clarence W. Moore, Havana, holds rights.

Ted Jones Drilling Co. of Cuba, representing Ted Jones, Los Angeles, drilling.

Trans-Cuba Oil Co., drilling acreage of Cuban Venezuelan Oil Voting Trust.

Cuban Kewanee Oil Co. (Kewanee Oil Co., Tulsa), deep test drilling.

Consolidated Astoria Mines, Ltd., Toronto, drilling.

Cuban Colombian Petroleum Co., drilling.

Caribbean Petroleum Associates, exploratory agreement with Sterling Oil Co., Tulsa, and Deep Rock Oil Corp., Tulsa.

Cuban-American Drilling & Exploration Co., (Grady Vaughn and H. W. Klein, Dallas, and Tevis Morrow, Los Angeles) on Cuban Venezuelan Oil Voting Trust farmout, recent drilling.

Russell Cobb, Tulsa, acreage holdings.

12. Commonwealth Oil Co., Miami, farmout to N. E. Andrews, Houston, drilling to begin soon.
13. McBride Oil & Gas Corp., San Antonio, license held, surface work under way.
14. Manabi Exploration Co., Inc. (controlled by Pantepec Oil Co.), exploratory and development drilling.
15. Douglas Oil Co. of California, offshore exploratory and development drilling.

Peruvian Pacific Petroleum Co., (Cities Service Co. and Richfield Oil Corp.).

16. Several smaller American companies hold acreage in Peru's Montana along with the major American operators. They are:

Cia. Petrolera Ganso Azul (Blue Goose), Ltd., controlled by Texas Gulf Producing Co. with small minority intersts held by two Michigan refiners, Kendall Refining Co. and Bay Refining Co.

Peruvian Oil & Minerals, Ltd., Toronto, drilling on some of Ganso Azul's acreage.

Peruvian Pacific (Cities Service and Richfield).

Union Oil Co.

17. Glenn M. McCarthy, drilling.

EUROPE

18. An American group, headed by General American Oil Co. of Texas, in partnership with a Spanish Government agency, drilling.
19. Macmillan Petroleum Corp., jointly with Gulf, in Mediterranean Petroleum Co., recent drilling.
20. William C. Helis, New Orleans, recent drilling.

MIDDLE EAST AND AFRICA

21. H. L. Hunt, Dallas, is expected to ask acreage along with several major companies when Libya opens up in the near future. Conorada (Continental Oil Co., Ohio, and Amerada Petroleum Corp.) also is interested.
22. Four American companies—Continental, Ohio, Cities Service and Richfield—are exploring a large section of Egypt from the Nile to the Libyan border, drilling under way.
23. Southern California Petroleum Corp. through a minority interest in International Egyptian Oil Co., exploration and development drilling.
24. Several companies have active operations in Israel. They are:

Pontiac Petroleum, on a farmout from Israel Continental Oil Co., Canadian operators, drilling.

Israel-American Oil Corp., formed by Husky Oil Co., Cody, Wyo., and Bear-Stearns & Co., New York investment firm, drilling.

Israel-Mediterranean Petroleum, Inc., and Pan Israel Oil Co., Inc., associated with Pantepec, drilling.

25. Several American operators as well as the large international companies have indicated an interest in acreage in Turkey. The smaller companies include Kern Oil Co., Ltd., a British company with production in California. Other independents are reported to be preparing to file for concessions in Turkey.
26. Sinclair Oil Corp., core drilling after two unsuccessful oil tests.
27. Continental, Ohio, and Amerada jointly. Moriqui Exploration Co., Los Angeles, sold its acreage in British Somaliland to Standard-Vacuum Oil Co.
28. A joint program now in the seismograph stage—50 per cent Sinclair and one-sixth each by Continental, Ohio, and Amerada.
29. Cities Service and Richfield, drilling a concession in Dhofar.
30. H. L. Hunt has applications pending for acreage in West Pakistan.

AUSTRALIA

31. Lucky Strike Drilling Co., representing Gene Goff, Tulsa, drilling on a concession in eastern Queensland.

PHILIPPINES

32. San Jose Oil Co., controlled by Pantepec, holding acreage in Luzon in the Philippines.

ing organizations abroad. While they already control large crude reserves in the Middle East and Venezuela, they have a need to diversify their production and stay abreast of the world-wide exploration effort, particularly in countries of consumption.

Arbitrarily lumping together as independents all companies other than the five major operators means including some of the most substantial American companies, such as Continental, Amerada, Ohio, Sinclair, Cities Service, and Union. Also included are small, nonintegrated operators from Texas and elsewhere in the oil country, a group which might be called the true independents.

Incentives . . . Given half a chance, many of these companies are willing to try their luck abroad. Some exploration men say it's because large blocks of reasonably good acreage are becoming increasingly difficult to find in the U. S. Then there's always the hope of finding another Saudi Arabia in some passed-by foreign country.

What these smaller companies mostly look for is cheap acreage set against a generally favorable political and legal background. To some companies, undertaking work outside the U. S., where the government is the all-important factor, is like plunging into the great unknown. But, despite this there seems to be a greater disposition to go out after the prospects abroad.

Examples . . . Looking at some of the individual areas, Cuba offers a prime example of good foreign territory for independents.

It is near home. Acreage was available since some of the major companies had become discouraged after 50 years or so of intermittent and unsuccessful work on the island. The Cuban Government made every effort to promote exploration, even to the extent of providing large loans. The country's oil laws were favorable. Hence, there was a rush into Cuba following the Echevarria discovery a year ago. Currently a number of independent operators are participating in the Cuban boom.

Although the Eastern Hemisphere is generally less attractive to the small American operator, several companies moved into Israel 2 years ago following passage of an oil law. There was plenty of exploration territory open as the larger companies stayed out. Some of the latter regarded the geology unfavorable. There was also the matter of relations with the Arab states with which Israel still is at war.

The future . . . Libya and Turkey are the next countries expected to open up to foreign oil capital. Some of the smaller American companies are expected to compete for acreage when the filing period in the two countries starts in the near future. Libya has just passed a new oil law. Turkey has straightened out the legal situation by passing several necessary amendments to its oil law of 1 year ago.

A boom was touched off in Australia 1½ years ago by the subsequently down-rated West Australian discovery of a company controlled by Caltex. Most of the activity there has been by local Australian companies; but one Southwest independent, Lucky Strike Drilling Co., is drilling the Maryborough area along the Queensland coast.

Italy to open . . . Observers of the foreign exploration picture expect Italy to open up in the near future by granting new concessions under the old 1927 oil law. Several American companies, including independents, are expected to be included through Italian subsidiaries or with Italian partners.

Venezuela is still considered to have the best oil territory in the Western Hemisphere. Some of the better-financed independent group probably will be on hand if and when new acreage grants are made in this country. The price will be high, however, since the bidding will be for known and very good areas.

Colombia is open to foreign operators on favorable terms, but so far work there continues to be by the larger companies—The Texas Co., Royal Dutch - Shell, and Socony through Colpet, and Jersey Standard through International Petroleum Co. (Colombia) Ltd. The only American participation in the predominantly British oil industry of Trinidad is through a Texaco producing interest and an exploration program of Standard of California.

Operations by foreign companies in Mexico are through percentage-of-production contracts with Petroleos Mexicanos, the government company. Mexico's efforts to attract foreign oil capital into the country about 5 years ago had few important results. The largest of the operators contracting with Pemex—Mexican American Independent Oil Co. (CIMA)—is not now actively exploring.

Not shown in the map or in the table is the Middle East operation of Pacific Western Oil Co. and American Independent Oil Co., since this is now beyond the initial exploration stage.

Both own concessions covering the Kuwait-Saudi Arabia Neutral Zone. American Independent is the operator, with costs and production shared equally with Pacific Western. Production currently is about 30,000 bbl. per day.

Refining Briefs

NEW YORK.—Refiners are interested in a new floating plastic screen which reduces evaporation loss by blanketing crude in cone roof tanks. LaRoche Freres of Paris developed the screen. It consists of a series of independent floats attached to a carpet of polyvinyl chloride. The circular carpet has a skirt forming a seal with tank walls. The entire assembly floats on the crude surface. Tests showed evaporation loss was cut 10 to 20 per cent.

TOLEDO.—Gulf Oil Corp. is operating a new 10,000-bbl. per day Platformer at its 44,400-bbl. daily refinery here. It is designed to convert a 206°-357° F. straightrun naphtha to a reformate with an F-1 octane number of 98, with 3 cc. of tetraethyl lead. Gulf also has a 17,750-bbl. per day Platformer operating at Philadelphia and is building two more—a 10,000-bbl. unit near Cincinnati and a 30,000-bbl. unit at Port Arthur.

OIL CITY, Pa.—Pennzoil Co. has received a certificate for rapid amortization on a new combination Unifining-Platforming unit at its Rouseville, Pa., refinery. The certificate covers 65 per cent of the $850,000 cost of the 3,400-bbl. Unifiner and 2,700-bbl. UOP Platformer.

NEW YORK.—The Texas Co. has let contract for its tenth Platforming unit. The latest is a 4,800-bbl. daily combination Unifiner-Platformer at the Casper, Wyo., plant. Six units totaling 83,600 bbl. daily are now in operation in plants at Amarillo, El Paso, and Port Arthur, Tex., Lawrenceville and Lockport, Ill., and Westville, N. J. Four more with total capacity of 34,800 bbl. daily are under construction at Lawrenceville, West Tulsa, Wilmington, Cal., and Casper.

KEVIN, Mont.—Big West Oil Co. has contracted with Universal Oil Products Co., Chicago, to build a 1,000-bbl. per day catalytic reforming unit at its refinery here. Completion is scheduled for October 1.

KANSAS CITY, Kans.—Phillips Petroleum Co. has awarded Procon, Inc., a contract to build a 16,000-bbl. catalytic reforming unit at its 55,000-bbl. refinery here. Construction is scheduled to begin late this summer with completion set for the spring of 1956. The refinery, in addition to serving the Kansas City area, also ships products through Phillips' Borger, Tex., to East Chicago, Ind., pipeline.

Gas Bill Vote Near

Revised Harris measure exempting natural-gas producers from most federal price controls heads to House floor

WASHINGTON.—The long-disputed Harris bill exempting independent natural-gas producers from federal price regulation is ready for House action.

The House interstate commerce committee has completed redrafting the bill. It now will go to the House floor with a report stressing necessity for doing something about the Supreme Court decision in the Phillips case to insure continued development of new gas resources.

As approved by the committee, the bill will exempt producers from most federal regulation. Authority of the Federal Power Commission will apply only after production, gathering, processing, treating, and compressing and upon delivery into an interstate pipeline.

The FPC, however, still will have a measure of control over prices paid producers. This will be accomplished by a new provision written into the bill by the committee to meet consumer objections to spiraling escalation clauses in purchase contracts.

New provisions . . . Harris originally gave the FPC control over price increases asked by natural-gas firms resulting from new or renegotiated contracts with producers. His bill provided that the FPC should consider whether the price is the "reasonable market price" in the field. The agency then could allow the company to charge as operating expense only that price. An additional fair gathering charge could be allowed where the price is for gas before gathering.

But the committee also added a similar provision covering increases resulting from escalation clauses. It permits the FPC to allow the natural-gas company to charge off as operating expense only that part of the higher price which does not exceed the reasonable market price.

Two exemptions were made from the escalation clause controls. They included contracts calling for increases by specific amounts in the price of natural gas at definite rates in the future and any provision under which the natural-gas company agrees to reimburse the seller for tax increases which may be levied after a specified date.

Senate hearings . . . While the House group was redrafting its bill, the Senate interstate commerce committee continued to hear protests from mayors and other municipal officials against loosening FPC control. But this week the committee will hear from city officials who support the Harris bill. It also may get FPC Chairman Jerome K. Kuykendall on the stand to explain the commission's support of the bill.

Tanker Program Slashed

WASHINGTON. — Administration plans to build more tankers, once enthusiastically endorsed in Congress, have received a setback. The House last week took another look at the cost and backtracked.

The House slashed Maritime Administration funds for the coming fiscal year by 37 per cent. Unless the Senate increases the ante, this means the end of plans to build a high-speed "prototype" tanker wanted by the Navy. And it will cut five tankers from the trade-in-and-build program which the House voted last year.

The fund for the trade-in program was cut in half. The House allowed $11,500,000. This will permit trade-in of 10 old tankers and construction of 5 new ones. The appropriations committee, which did the paring, made no comment on the plan to build prototype ships other than to say it would not recommend it "at this time."

West Coast Drilling Island Proves Successful

Monterey Oil Co.'s drilling island located a mile and a half offshore from Seal Beach, Calif., already has proved successful. The company has drilled five producers from it so far and it plans to drill 60 to 70 additional slanted wells. The barge to the right of the island is putting the finishing touches on an 8-in. crude line which will connect the wells with separating and storage facilities on shore.

FPC Scans Gas Deal

Pacific Northwest Pipeline asks final approval of plans to import Canadian gas from Westcoast Transmission

WASHINGTON.—Final steps to obtain Canadian natural gas for the Pacific Northwest were taken by Pacific Northwest Pipeline Corp. last week.

The company asked the Federal Power Commission for presidential permits to import and export gas, FPC authorization of such movement, and permission to build necessary facilities.

Pacific Northwest already has started building a $160 million pipeline from San Juan basin gas fields of Colorado to Washington State. This project was approved by the FPC last June 18. The line is designed to carry up to 343,000 M.c.f. of gas daily.

The Canadian gas will enter the United States through Westcoast Transmission Co., Ltd.'s 650-mile line from the Peace River area of Alberta and British Columbia. The Westcoast line will run to Vancouver, but a spur will be laid to the international border to tie in with Pacific Northwest's line at Sumas, Wash. *(The Oil and Gas Journal, May 23, page 83).*

The plan . . . Pacific Northwest told the FPC it proposes to import 300,000 M.c.f. of Canadian gas daily and deliver 250,000 M.c.f. of this to El Paso Natural Gas Co. This gas will be piped to the California market by El Paso Natural. A 22-year contract for the supply of gas and resale was signed last December *(The Oil and Gas Journal, December 20, 1954, page 58).*

In its latest FPC application, Pacific Northwest added 14 communities in Washington and Idaho to its service area. It also announced plans to export gas to Vancouver and Trail, B. C. The exports will serve Consolidated Mining & Smelting Co. of Canada at Trail and the city of Vancouver temporarily until Westcoast's line is completed.

Construction of the new line is expected to take two seasons. Service on the major part of the line is planned to start before mid-1956. Gas is scheduled to start moving from Peace River fields about November 1, 1957.

Montana deal approved . . . In another matter involving Canadian gas, the FPC last week approved an examiner's decision of last March 21 authorizing Montana Power Co., Butte, Mont., to import 20,000,000 M.c.f. of gas annually from Canada at a rate not above 100,000 M.c.f. per day. The authorization will run to May 14, 1974.

The gas will come from the Pakowki Lake area in southeast Alberta. It will be produced and gathered by Canadian-Montana Gas Co., Ltd., a subsidiary of Montana Power, and delivered at the border near Whitlash, Mont., by another subsidiary, the Canadian-Montana Pipe Line Co.

The company now is able to import 10,000,000 M.c.f. a year at a rate of up to 40,000 M.c.f. daily. This authorization will expire next April 7. The new import arrangement has been approved by the Alberta Petroleum and Natural Gas Conservation Board, and application for an export permit is pending before the Minister of Trade and Commerce.

War Line Revived

Products carrier to East Coast being reconsidered

WASHINGTON.—Government officials are trying again to figure out how to prevent the East Coast from suffering an oil products shortage in case of war.

The oil industry is reluctant to build a pipeline for which there is no immediate economic need, and the Government is split between two choices:

. . . One group believes that the solution of any shortage is stockpiling products for future use.

. . . Another group believes in the Government financing a Texas-East Coast line and letting it remain idle until needed.

The latter course has been urged for years by Paul Ryan, president of the American Pipe Line Co. Ryan often has sought government support for a 24-26-in., 1,425-mile line from Beaumont, Tex., to Newark. The line would cost about $147,000,000 and would have a capacity of nearly 500,000 bbl. daily.

Office of Defense Mobilization officials generally favor stockpiling. However, recent reports say that Arthur S. Flemming, director of mobilization, has held recent talks with Ryan and may put his pipeline idea before the Treasury Department.

Little Inch conversion . . . The famed Little Inch line, a natural-gas carrier owned by Texas Eastern Transmission Corp., has been approved by Federal Power Commission examiner for conversion to products use. The line was built during the war and used as a products carrier. Texas Eastern later acquired the line and converted it to gas.

The reconversion to products lacks only the commission's endorsement of the examiner's approval *(The Oil and Gas Journal, April 18, page 101).*

The company's plans hit a minor snag last week when a group of Mississippi River barge operators asked the FPC to reopen hearings on the conversion. The firms claim new evidence proves that the switch from natural gas to products is not necessary for the reasons advanced by Texas Eastern.

The barge operators also say that the line would become a part of the normal supply pattern and would offer no insurance in case of war.

Race Policy Studied

Negroes complain refiners discriminate against them

WASHINGTON.—The Defense Department is investigating accusations that refiners and labor unions are discriminating against Negro workers.

The National Association for the Advancement of Colored People made the accusations in a complaint filed with the President's committee on government contracts headed by Vice President Nixon.

The association declared all Negro workers are hired as laborers and all white workers are hired at some higher classification—both without regard to training, skills, work history or potential. Negro workers, the complaint argued, cannot get the necessary experience or training to reach skilled jobs.

The N.A.A.C.P. complaint covered claimed discrimination in hiring, upgrading, rates of pay, job classification, and apprentice training. It said the pattern has the active support of unions and is not confined to any specific company or union but is prevalent throughout the industry.

A number of specific instances of discrimination were cited, but the association asked for a complete investigation of employment patterns in the entire refining industry.

The Government imposes its policy of no racial discrimination through the Walsh-Healey Act which requires firms holding government contracts to conform with federal labor regulations. The Nixon committee moved to tighten the policy by writing a new clause to be inserted in government contracts. It requires contractors to agree not to discriminate in promotions or hiring employes.

Storage Expanded

FPC approves gas project, studies second proposal

WASHINGTON.—The Federal Power Commission has authorized expansion of one natural-gas underground storage system and is studying a request for large-scale testing of another.

The FPC authorized Michigan Gas Storage Co. of Jackson, Mich., to enlarge its transmission system. The company plans to build 36 miles of 16-in. pipeline and install an extra 3,300 hp. at an existing compressor station.

The new facilities will cost $2,572,000. They will enable Michigan Gas to withdraw additional storage gas in winter to serve its sole customer, Consumers Power Co. Also additional gas supplies can be handled for storage from Panhandle Eastern Pipe Line Co.

The new line will extend from Mount Pleasant Junction to Zilwaukee Junction.

Northern Natural Gas Co. of Omaha, Neb., meanwhile, has requested FPC authority to build and operate a pipeline system for large-scale testing of gas storage reservoir near Redfield, Iowa.

The FPC last August authorized Northern to construct temporary testing facilities. Northern reported these tests successful and asked for larger testing facilities.

Northern plans to build about 28.4 miles of 30-in. pipeline from its Ogden compressor station to the storage site. It also plans a gathering system in the storage area connecting about 11 wells, dehydration units, and miscellaneous facilities. Total cost will be $4,816,000.

Baytown Rubber Plant Sold

WASHINGTON.—Sale of the Government's synthetic-rubber plant at Baytown, Tex., to United Carbon Co., Charleston, W. Va., was announced last week by the Rubber Disposal Commission.

The 44,000-ton-capacity GR-S plant brought $7,153,000. The sale insures that it will be kept in operation as part of the privately owned synthetic-rubber industry.

The Baytown plant was not included in the big sales program sent to Congress early this year because only one bid had been made for it, and the price the commission thought it was worth could not be secured.

The sale left the Government with only two of its 27 plants on its hands.

The Baytown sale now goes to Congress, which has 30 days in which to review it.

WATCHING WASHINGTON

Bertram F. Linz

ICC Stirs Coal Embers

The Interstate Commerce Commission is smack in the middle of the running fight between coal and oil.

It got there when it talked of a ceremony to mark what it called the passing of the coal-burning steam locomotive from the American transportation scene. That roused the wrath of the coal-producing states, which are heaping coals of fire on the collective ICC head.

The old iron horse is far from dead, the coal producers cry. In fact, it may be about to stage a comeback. There are still 7,000 coal-burners at work, they say. And a steam-turbine locomotive has been developed that is more efficient and economical than a diesel engine. It may become the primary type of locomotive in the not distant future, according to Sen. Matthew M. Neely of West Virginia, a coal-industry spokesman.

Neely says it's a "fantastic scheme" to bury the coal locomotive alive.

The hassle started when the St. Louis & San Francisco retired all its steamers. It offered the ICC a locomotive bell, complete with "headstone" marking the passing of the coal eater.

Last April 1 there actually were 7,718 coal burners in service. But there were 24,024 diesels. At the end of the last war there were 38,853 coal locomotives and as late as the end of 1953 there were 11,787. But of 21,188 new locomotives bought since the war, 20,708 were oil drinkers. Today, 62 of the 130 Class I railroads operate only diesels and 13 others operate on diesels but have steamers in reserve.

Tanker Bids Due June 2

Government officials will disclose this week whether the build-and-charter tanker program laid out by Congress last year is finally to get under way.

The Military Sea Transportation Service wants private capital to build 15 supertankers which it can lease for 10 years and buy at the end of that time if it wants to keep them.

Originally, it was planned to open bids January 20. The MSTS had tentative offers for 23 vessels, but they never were firmed up. The opening of bids was deferred several times. Now it is set for June 2. Recent developments make officials hopeful it will go through this time.

The big issue has been the financing of the tankers. The charter terms are not too generous—not more than $5 per ton per month—but the industry felt it could live with them if it got enough help building ships.

The Government offered to guarantee 90 per cent of mortgages for 87½ per cent of the construction cost. The industry argued that the tankers were special-purpose vessels on which the Government could and should give a 100 per cent guarantee. The Government refused to give in.

Now it appears that industry must build the tankers on government terms or see the MSTS continue to handle the transport of military oil indefinitely. But the program itself raises doubt whether the MSTS would get out of business. It can buy vessels when the charter period ends.

Higher Gasoline Tax Likely

No matter what kind of highway-building program Congress provides, it seems pretty sure the federal gasoline tax will be nudged to a higher figure.

There's a real fight going on over whether the Government should plan its program on a pay-as-you-go basis or go out and borrow some $26,000,000,000. But either way the motorist is going to foot a good part of the bill. He will either pay for his road a foot at a time or pay the interest on the money borrowed to build it. Another cent a gallon on the gasoline tax may be needed to do either.

There's also a fight over putting toll roads into the national highway system. They would add to the cost of motoring by a cent a mile or better. A lot of people in the oil industry don't like toll roads. One company usually gets a monopoly on gas stations, and only the big companies can pay for the privilege.

It's quite likely that the road bill won't get through Congress until next year. And next year both political parties will want to sponsor tax cuts as bait for votes in November. It will take nimble footwork to repeal the emergency increase in the gasoline tax and at the same time increase it to pay for highways.

SIGN OF THE TIMES in the over drilled townlot area is this group of pumping wells, most of which were slant-drilled.

Huntington Beach Bubble Bursts

D. H. Stormont

LOS ANGELES.—The townlot drilling spree is subsiding at Huntington Beach. But before it dies, a new state record for over-development will have been set.

How much reservoir energy and ultimate oil recovery have been lost through over drilling will never be determined. But there is no question that extremely dense drilling and wide-open-flow production resulted in an economic waste in excess of $12,000,000.

The Placerita field near Newhall, a 1949 development, has been the modern classic example of over drilling. There, about 160 wells were completed in a 60-acre townlot tract.

At the Jones pool on the southwest edge of Huntington Beach, about 200 wells have been completed since its discovery on January 1. The total probably will exceed 225 and may reach 250 before the last well is drilled.

Covers 30 blocks . . . This activity, which saw 45 rigs at work during the peak, was confined to a 30-block area of approximately 85 acres. If good development practices had been followed, such as are being used in oil states where the "law of capture" does not

THIS RIG is drilling on the Pacific Electric right-of-way which separates the townlot area from state tidelands. Bids on the 320-acre offshore tract will be opened June 8.

prevail, only 15 or 16 wells would have been drilled.

The other 200-odd wells will be unnecessary. They represent over-investment in drilling. They will increase lifting costs because of wasted reservoir energy.

The 3,700 to 4,000-ft. pool is fairly well defined. The anticlinal structure is limited on the north flank by a northwest-southeast fault near Orange Avenue. The sand is present beyond that limit but is wet. On the seaward side, where faulting is believed to limit production also, there are indications the pool's limit may not be too far from shore. This, however, is not expected to prove much of a deterrent in the bidding for a 320-acre state offshore tract, bids on which are to be opened June 8.

Daily output last week continued to hover near the 11,000-bbl. mark. All of the 200 wells were pumping, with most producing about 60 bbl. daily. Total output to date already has exceeded 1,200,000 bbl., or a recovery of about 92 bbl. per acre-foot.

Best portion of the field proved to be in the discovery area. There the net sand thickness is about 180 ft. Permeabilities were about 600 md.

Output drops fast . . . Several wells in this area came in flowing 800 bbl. or more daily. Because of the dense drilling and high withdrawal rates—some gas was blown to the air—their production quickly dropped. About a month later, 1,000-bbl. wells of early January were down to 500 bbl.; 2 months after completion they were down to 150 bbl.; and by mid-April they had declined to 70 bbl. Probably less than a dozen have paid out.

Engineers familiar with the field believe the Jones pool, including a stray sand a few hundred feet above the main pay, will have an ultimate production of 3,250,000 bbl. This estimate is based on the 85-acre area, a net oil-sand thickness of 150 ft., and a recovery of about 250 bbl. per acre-foot. It would represent a 23 per cent yield from the 1,100 bbl. per acre-foot of tank oil in place.

The low recovery is anticipated under primary production methods since the pool is of the depletion type. Despite a large drop in reservoir pressure, estimated to have been 1,725 psi., there has been no evidence of water drive. Porosity averages about 27 per cent and permeability around 500 md.

Big loss expected . . . Based on present posted prices for the crude, which averages 20.5° gravity, total income from the oil and gas would approximate $2.50 per barrel. Total income for the pool would be $8,125,000. From this, however, must be deducted the landowner's royalty, estimated to average 20 per cent or 44 cents per barrel, and a trucking cost of some 10 cents per barrel. Pumping costs will further lower the yield so that net profits may be in the range of $1.00 to $1.25 per barrel.

For the privilege of producing this some 3,250,000 bbl. of oil and gas, with a current value of around $8,125,000, Huntington Beach operators will spend more than $12,500,000 in drilling and lease costs.

Total cost of these wells is about $55,000 or $60,000 each. This reflects the unusually high prices paid in many instances for drill sites. As high as $10,000 was paid for a lease on a 25 by 150-ft. lot to be used as a drill site.

High-priced leases, plus the fact many of the wells are being whipstocked several hundred feet, make the average total cost high even though some second-hand equipment is being used.

Quick approval of senate bill seen . . .

Tidelands May Be Opened Soon

LOS ANGELES. — California's tidelands soon may be opened to exploration and development.

A bill which would accomplish this was ready to reach the senate floor late last week and is expected by many to be approved before the legislature adjourns June 7.

If Gov. Goodwin Knight signs the approved bill as expected, the law will become effective 90 days later. Thus exploratory drilling in offshore areas could be under way early next year.

Though watered down from the legislation sought by the Western Oil and Gas Association, the bill provides for:

. . . Opening the state tidelands between the north city limit of Newport Beach and Oceano in San Luis Obispo County.

Excepted would be areas lying offshore from Santa Monica, Santa Barbara, and resort communities which want no oil activity off their beaches. However, if the beach cities later should permit drilling, the state drainage clause would become effective and adjacent state tidelands would be opened for drilling.

. . . A maximum size of individual parcels of 5,760 acres.

The State Lands Commission, charged with administering the tidelands, can set a smaller size. Likewise, it will determine when parcels sought by individual oil companies will be offered for lease. It can reject any bids it feels are insufficient, or if it believes any one company is getting so much tidelands area there is danger of monopoly. Among other broad powers is the right to approve all lease transfers.

. . . Drilling from platforms, piers, or filled earth islands—with no mention of barge operations.

The type of structure to be used will be specified by the commission in its request for bids. It also may ask that holes be slanted from sites on shore.

. . . Awarding of exploratory parcels on a bonus-bid basis with each providing for a 12½ per cent royalty. Proved acreage will be awarded also to the highest bonus bidder, but here the royalty will be on a sliding scale beginning at a minimum of 16⅔ per cent.

Union Completes Crude Line

LOS ANGELES. — Union Oil Co. has put into operation a new 65-mile, 12-in. crude pipeline linking wells in Ventura County with its refinery at Wilmington.

The mutimillion dollar pipeline can handle 50,000 bbl. of crude a day with a single pumping station. Capacity can be increased to 70,000 bbl. daily by installing a midway booster pumping station. The system will carry production from the Torrey-Oakridge-Simi fields, discovered 2 years ago by Union, as well as production from other fields in the area.

Ammonia Plant Planned

MERCED, Calif.—Ammonia Chemical Corp. of California will construct a $3,250,000 anhydrous ammonia plant in the Red Top district near here.

The plant will process natural gas from nearby fields in the area.

Ammonia Chemical, which has its headquarters in San Francisco, said the company will build an entire community for plant employes and their families.

Beach Drilling Vote Set

LOS ANGELES.—The voters of Redondo Beach will decide two controversial drilling issues at a November 8 referendum. They will determine which of several proposed drilling contracts to accept and whether to lift drilling restrictions in effect in the beach area since 1935.

U.S. Seeks Showdown With Louisiana

Government retaliates after record-breaking lease sale, asks Supreme Court to fix state's offshore boundaries

BATON ROUGE.—The "cold war" between the federal Government and Louisiana over the state's seaward boundary has flared into open legal warfare.

The spark that set it off was a record-breaking lease sale held by Louisiana in which the prize was offshore oil. The Government protested leasing of nine tracts where it questioned state ownership. Almost immediately, Atty. Gen. Herbert Brownell asked the U.S. Supreme Court to determine the limit of Louisiana's jurisdiction over offshore lands.

Here's the sequence of events leading to what probably will be a long and bitter legal wrangle before the highest court in the land:

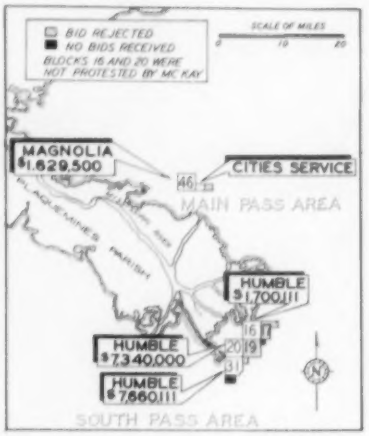
. . . Louisiana accepted a record-toppling $21,339,302 in cash bonuses for oil and gas leases on 25,736 acres of land. Included in that sale was the biggest bonus ever paid for a tidelands lease.

Humble Oil & Refining Co. gave Louisiana $1,637 an acre or a total of $7,660,111 for a 4,687-acre block at the mouth of the Mississippi River. Humble also paid $7,340,000 for the 5,000-acre block adjoining the first block to the north. Both easily topped any previous high for total bids on offshore lands.

. . . Interior Secretary Douglas McKay protested by wire to the Louisiana Mineral Board that nine of the tracts offered for lease "are in apparent encroachment" on the lands which the federal Government claims. Among the 9 tracts was the record-breaking Block 31 of the South Pass area for which Humble paid $7,660,111.

. . . The Mineral Board retaliated with a formal resolution the following day calling on the federal Government to "rescind and abandon" its plans to offer 244,000 acres of submerged tidelands off Louisiana for leasing July 12. The board warned in almost the same breath that it plans to "take such action as it deems necessary" to protect the state's property rights.

. . . The clincher came the same day when Attorney General Brownell moved into the Supreme Court. He asked that the court fix Louisiana's boundary at "3 geographical miles from shore." The attorney general previously had said he intended to go to court to have the boundary fixed. But no mention was made of the Louisiana sale which apparently triggered the court action.



Brownell said he asked the court to take action because of the serious operating problem in developing the offshore lands because of Lousiana's claims.

Protested tracts . . . Curiously enough only three of the nine blocks which McKay protested were leased by the Louisiana Mineral Board. No bids were received on two and bids were rejected on the remaining four.

The only large tract leased besides Humble's Block 31, was Block 46 of the Main Pass area. Magnolia Petroleum Co. got the lease for $1,629,500 in bonuses. Cities Service leased the southwest corner of Block 45 in Main Pass. This was also protested.

The Mineral Board also rejected bids on the southeast quarter of Block 45, Main Pass; about three-fourths of Block 17, South Pass; Block 19, South Pass; and the extreme northeast section of Block 32, South Pass.

No bids were received on the northeast section of Block 18, South Pass or the northwest quarter of Block 34, South Pass.

Louisiana moves . . . Last week Louisiana officials appeared to be ready to try at least some form of conciliation, but if it doesn't work, they are ready for an all-out battle in the courts. Members of the Mineral Board moved on Washington for "conferences" with federal officials. Just what they talked about specificially or to whom was not clear in Baton Rouge.

When word of Brownell's action reached Louisiana, the legislature immediately began considering an appropriation of $150,000 to finance the Mineral Board's fight.

Spurred by the federal action, the state board actually passed two resolutions. One called on Uncle Sam to call off its planned leasing and pointed at more than 100 tracts in dispute which are to be included in the July offering. Louisiana protests the federal leasing of any lands located between the 3-mile line from shore and the 3-league or 10.5-mile line which Louisiana claims.

A companion resolution warned oil companies that Louisiana intends to defend its claim to these tracts.

A 1954 act of the Louisiana Legislature is the basis of the state's stand. The act sets Louisiana's Gulf boundary as 3 leagues from a "shore line" set by the Coast Guard many years ago. This "shore line" actually is some distance at sea in some locations. This puts Louisiana's boundary claim as far as 30 miles from land in spots *(The Oil and Gas Journal, August 2, 1954, page 54)*.

Brownell's position . . . The attorney general's brief filed before the Supreme Court states flatly that the United States believes the Louisiana boundary "is and has always been 3 geographic miles from the low-water mark and outer limit of inland waters."

"It appears to be in the interest of both the United States and the State of Louisiana," Brownell said, "to have their respective rights determined in the Supreme Court . . . as soon as possible."

Brownell actually is asking the high court to modify its now-famous "paramount rights" decree of 1950 which has since been overturned, at least in part, by the Tidelands Act of 1953.

The 1950 ruling said the federal Government's rights to all natural resources offshore were "paramount." The 1953 act of Congress gave coastal states rights to oil and other natural resources up to 3 miles from their coast lines.

Others involved . . . The Gulf Coast states, at the insistence of Texas, were

excepted to this extent—they got the right to oil and other natural resources as far out as their "historic boundaries." In the case of Texas, this is 3 leagues rather than 3 miles because of the terms under which Texas entered the union.

Since that time, Louisiana has made the same claim as Texas and even gone Texas one better with its seaward "shore line." Now, it's up to the Supreme Court to settle the question.

Since the Supreme Court is expected to end its term this week or next, the Louisiana boundary question will not come up for consideration until next October.

Meanwhile, Interior Department officials explained that Secretary McKay's protest to the mineral board over the lease sale was "more for the record than anything else."

The Government's petition made no mention of Texas or Florida, whose Gulf boundaries have so far been recognized as 3 leagues. But it could be inferred that the boundaries of these states also could be contested.

The construction which the Government places on the wording of Louisiana's boundary claim, Brownell said, "conforms to the settled policy of the United States, which from its earliest beginnings has firmly and consistently adherred to the policy of limiting to 3 miles its own claims of territorial waters."

Expansion in Rubber

Petro-Tex will double size of recently acquired butadiene facilities; synthetic-rubber works also will be expanded

HOUSTON. — Private industry last week disclosed plans for a 50 per cent expansion of the nation's second largest butadiene plant here less than a month after it passed from government to private ownership.

At the same time, Goodyear Tire & Rubber Co. announced a similar expansion for a synthetic-rubber plant next door to the butadiene plant.

A new company, Petro-Tex Chemical Corp., has been formed to operate the butadiene plant by officials of the two companies which paid the Government $27,197,000 for it in April. The plant was purchased jointly by Tennessee Gas Transmission Co. and Food Machinery & Chemical Co.

The expansion plans, plus an ambitious program of research in butadiene, were revealed here by Gardiner Symonds, president of T.G.T., and Paul L. Davies, president of Food Machinery. Symonds will be chairman of the board of Petro-Tex and Davies will be president and chief executive officer.

Research plans . . . The two executives said the new company will spend $1,500,000 for a new butadiene research laboratory and at least $1,000,000 a year for the next 5 years carrying out basic research in butadiene. Emphasis will be on new uses for butadiene, especially those that might be adopted to Food Machinery's nylon and plastics programs.

During the same 5-year period, Petro-Tex intends to increase the output of the butadiene plant by "at least" 50 per cent. Symonds said last week he'll be disappointed if the expansion isn't greater than that. The plant, second largest of its kind in the nation, was completed in 1944 as a part of the wartime emergency program to produce the ingredients for synthetic rubber. Its initial capacity was 50,000 short tons of butadiene a year. This was later boosted to the present capacity of 90,000 tons annually.

The plant was operated by Sinclair Rubber, Inc., a subsidiary of Sinclair Refining Co., until T.G.T. and Food Machinery bought it from the Government.

Goodyear expansion . . . Goodyear Synthetic Rubber Corp. which operates an adjoining plant takes practically the entire butadiene output of the Petro-Tex plant through a pipeline linking the two.

E. J. Thomas, president of Goodyear Tire & Rubber Co., revealed last week that the synthetic-rubber plant will also expand 50 per cent in the next 5 years. Thomas said a $750,000 spending program will boost the Goodyear plant's cold-rubber output by half.

New Petro-Tex officers . . . Joseph R. Mares, former vice president of Monsanto Chemical Co., will be managing director of Petro-Tex; Gordon A. Cain, former assistant to the manager of Food Machinery's Westvaco mineral products division, is vice president and treasurer; T. V. Mertz, former superintendent of T.G.T. compressor stations, is vice president; and J. P. Lockwood, of T.G.T.'s treasury department, is secretary and assistant treasurer.

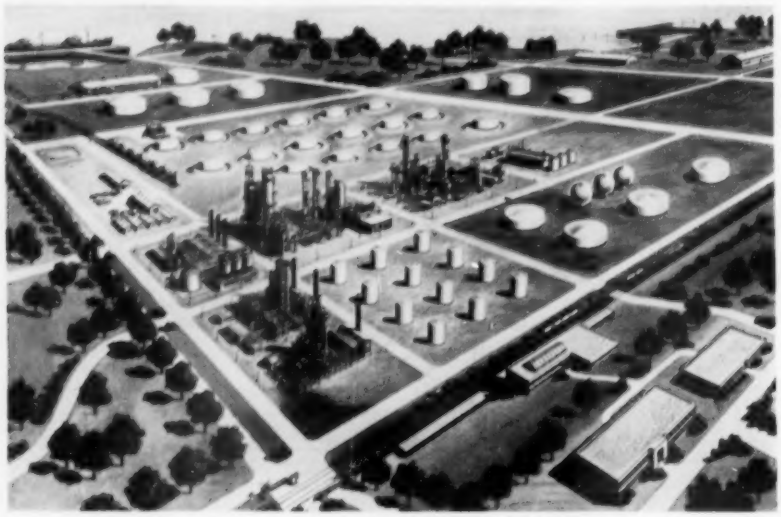
Petro-Tex directors include Symonds, Davies, Mares, Ernest Hart, executive vice president and director of Food Machinery; Dr. Carl F. Prutton, vice president and director of Food Machinery; and J. J. King and R. R. Dean, both vice presidents of Tennessee Gas Transmission.

Suntide Buys Crude Line

CORPUS CHRISTI, Tex.—Suntide Refining Co. has formed a wholly owned subsidiary to operate the 250-mile, 2 to 6-in. crude-oil gathering system recently bought from Sunray Coastal Pipe Line Co.

The new company, Suntide Pipe Line Co., already has begun expanding the system to increase its capacity from 20,000 bbl. daily to 35,000 bbl. Present expansion program calls for adding 18 miles of line and looping additional parts of the line.

SPHERICAL storage and fractionator towers at Petro-Tex.



ARTIST'S SKETCH of Commerce's proposed Rhode Island refinery.

New Refinery Studied

Commerce Oil Refining proposes 30,000-bbl. Rhode Island plant; final decision to build project has not been made

George Weber

PORTSMOUTH, R. I.—If Commerce Oil Refining Corp. follows through on plans, New England will have a 30,000-bbl. per day refinery near here.

The proposed plant will incorporate all the latest processing techniques for making the most high-octane gasoline. It will be capable, if necessary, of producing 100 octane premium grade motor fuel.

Commerce has passed the first step in its plans. It has obtained a permit from the Portsmouth Town Council to build the plant near here.

Commerce is the second independent in recent months to announce plans for invading the major refiners' stronghold along the East Coast. Earlier this year, Miami Oil & Refining Co., associated with the Frontier Refining Co. of Denver, revealed plans for building a plant near Fort Pierce on Florida's East Coast. Both of the proposed plants will process imported crude, if built.

While independent refiners move products to East Coast markets, there has been no independent refinery in this region since Barber Asphalt Co. sold the Perth Amboy, N. J., refinery to California Oil Co. in 1946.

The refinery . . . Over-all design of the new Portsmouth refinery is fairly well determined although selection of processes and sizing of units are not firmed up. Formal financing of the $30,000,000 project is yet to be arranged.

In general, the refinery will produce fuels, gasoline, burning oil, diesel fuel, heavy fuel oil, and possibly coke. It will follow the combination concept of design, with units closely integrated for greater economy and operation.

Gasoline production will be maximized with total yield on the order of 55 to 60 per cent of crude charged. Moreover, a high pool octane is the object. Actual octane levels of initial production will, of course, be determined by the competitive situation at the time the plant will be placed on stream. But if necessary, a premium grade of 100 octane will be possible.

In order to maintain this high level of conversion, the refinery will incorporate five catalytic units—cracking, reforming, alkylation, polymerization, and hydrogen treating. In addition, catalytic recovery of elemental sulfur from hydrogen sulfide is proposed.

The combination atmospheric and vacuum crude unit may be sized to charge 40,000 bbl. per day. Operations are planned at this level if the heavy-fuel market warrants it. The cat cracker will probably be capable of taking a total reactor charge of 25,000 bbl. per day at the high conversion levels planned. No decision has yet been made between the fluid or moving-bed types of process.

Various catalytic reforming processes are under study—primarily Universal Oil Products Co.'s Rexforming process and Houdry Process Corp.'s Iso Plus. The company seems firmly committed to the modification of catalytic reforming which will permit extraction of low-octane components from finished reformate, for recycling.

A hydrogen-treating operation is definitely planned. This will apply not only to reforming feeds, but probably also to middle distillates and catalytic cycle stocks. While the company will be in a position to produce some aviation gasoline for local military markets, no decision has been made as to the disposition of the alkylate to be produced. Both alkylation and polymerization units will be sized large to convert the effluent streams from the major light ends recovery system to high octane gasoline components.

Coking is under consideration. If adopted, the company may well elect to use the delayed-coking process. Particular attention will be devoted to rigid pollution control, both of the atmosphere and the local waters. This will require hydrogen sulfide extraction and conversion to elemental sulfur although the program may not be justified on the basis of income from sales of sulfur itself.

The schedule . . . With the permit in hand, the company plans to move fast. Design of the project is in the hands of Lummus Co. Company officials state that they propose to begin negotiating processing licenses within a few weeks and have scheduled ground breaking for September or October. If this schedule is kept, the refinery may be completed sometime in 1957.

A 460-acre tract is being optioned, with additional acreage sought for tank storage. The tract lies near the Newhope Bridge, on Aquidneck Island north of Newport. This same area was considered by American Oil Co. last year before Amoco decided to build near Yorktown, Va. The tract is described as ideal for a refinery, with excellent deep-water frontage for tankers and a firm footing for process units.

The company . . . Commerce Oil Refining Corp. has been formed by Commerce Oil Corp. of Warren, Pa., for the purpose of building the new refinery. President of both companies is Harry R. Lewis. Harold M. Geller of

New York is treasurer and general counsel. The new company has offices at 515 Madison Avenue, New York.

The parent company is engaged in buying and selling crude oil, products, and chemical additives. It has handled some foreign crude for U. S. buyers, principally French production from Iraq and Qatar. It is also engaged in handling some U.S. exports of lubes and lube additives.

If the refinery is built it will probably process foreign crudes. No commitments have been arrived at to date.

June Imports to Soar

Reports to Texas Railroad Commission indicate receipts of foreign crude in U. S. will set new record next month

AUSTIN.—Crude imports will set a new record in June if importing companies carry out the plans reported to the Texas Railroad Commission.

These companies said their crude imports for the first quarter of this year averaged 729,900 bbl. daily, only about 1 per cent short of the actual crude imports tabulated by the Census Bureau of the Department of Commerce. These same companies indicated in reports to the commission that they plan to bring in crude during June at the rate of 773,800 bbl. daily for a 25 per cent increase over the same month last year.

Reported plans for crude imports for the first 3 quarters of the year show reductions in percentage increases over last year for each successive quarter, but these lower percentage increases seem to be due as much to climbing imports in 1954 as to actual cuts in schedules for 1955.

Crude imports for the first quarter, as shown by reports to the commission, represent a gain of 17.8 per cent over the first quarter of 1954. The second quarter average is expected to be up 13.5 per cent with the third quarter up 11.5 per cent.

The largest drop in percentage gain is between the first and second quarters. Crude imports for the second quarter will be 5,000 bbl. daily less than in the first, compared with a boost of almost 21,000 bbl. daily between the first and second quarters last year. The gain in the third quarter this year will be 15,300 bbl. daily compared with an increase of 24,600 bbl. daily last year.

Actual data for the first quarter and forecasts for the second and third indicate that crude imports for the first 9 months of the year will be 14.3 per cent greater than last year.

Companies reporting to the Texas Railroad Commission accounted for only 79.2 per cent of product imports in the first quarter. If this ratio holds, product imports for the first 9 months of the year will show an increase of about 14.7 per cent over the same period of 1954.

Breakdown of Reports to Commission

(Thousands of barrels daily)

	—Actual*—		—Estimated or forecast—				
	April 1954	April 1955	May 1955	June 1955	July 1955	Aug. 1955	Sept. 1955
CRUDE—EAST COAST:							
Atlantic Refining Co.	60.2	64.7	63.3	63.3	63.3	63.3	63.3
Cities Service Co.	7.0	12.0	32.8	42.8	18.4	38.3	36.0
Eastern States Petroleum Co.	4.3	4.0	19.3	36.8	20.8	7.8	7.8
Gulf Oil Corp.	93.0	117.0	116.0	115.0	115.0	115.0	115.0
McBride Oil & Gas Corp.			3.2	3.3	3.2	3.2	3.3
Phillips Petroleum Co.	6.6	6.5	9.7	10.0	9.7	9.7	10.0
Sinclair Oil Corp.	60.4	60.4	66.0	66.0	66.0	66.0	66.0
Socony Mobil Oil Co.	89.0	85.4	75.0	75.0	67.0	64.0	64.0
Southwestern Oil & Refining Co.		7.5	7.1	7.3	3.6	3.6	(‖)
Standard Oil Co. of California	66.2	80.6	74.4	74.4	74.4	74.4	74.4
Standard Oil Co. (Ind.)	16.5	18.1	16.5	17.0	16.3	16.4	16.9
Standard Oil Co. (N.J.)†	85.0	60.0	79.0	79.0	79.0	79.0	79.0
Sun Oil Co.	7.6	7.6	18.4	29.5	31.6	28.5	28.3
The Texas Co.	46.1	58.3	60.5	71.9	72.3	68.9	60.7
Tide Water Associated Oil Co.		7.6	11.7	8.0	7.7	11.6	12.2
Total East Coast	541.9	589.7	652.9	699.3	648.3	649.7	636.9
CRUDE—WEST COAST:							
Shell Oil Co.					20.0	20.0	25.0
Socony Mobil Oil Co.		25.9	27.0	27.0	27.0	27.0	27.0
Standard Oil Co. of California	17.6	19.7	16.7	16.7	16.7	16.7	16.7
Tide Water Associated Oil Co.	7.9	34.1	27.2	27.0	19.8	29.7	12.9
The Texas Co.	4.4		7.6	3.8	9.3	7.4	10.0
Total West Coast	29.9	79.7	78.5	74.5	92.8	100.8	91.6
Total crude	571.8	669.4	731.4	773.8	741.1	750.5	728.5
PRODUCTS:							
Asiatic Petroleum Co.	1.1	4.4	6.5	8.0	7.5	7.0	4.8
Cities Service Co.			1.5				
Eastern States Petroleum Co.	20.0	23.5	17.3	17.3	17.3	17.3	17.3
Gulf Oil Corp.	6.0	5.0	4.0	6.0	6.0	6.0	6.0
Shell Caribbean Petroleum Co.‡	72.0	110.0	75.0	80.0	70.0	74.0	92.0
Shell Oil Co.	25.7	17.9	14.9	19.7	21.8	20.8	19.0
Socony Mobil Oil Co.	10.4	13.8	7.9	7.9	7.9	7.9	7.9
Standard Oil Co. (Ind.)§	13.4	15.3	32.1	14.5	16.1	17.7	18.3
Standard Oil Co. (N.J.)†	149.0	167.0	151.0	151.0	114.0	114.0	114.0
The Texas Co.	3.4						3.5
Total products	301.0	356.9	310.2	304.4	260.6	264.7	282.8
Total crude and products	872.8	1,026.3	1,041.6	1,078.2	1,001.7	1,015.2	1,011.3
Bonded fuel included¶	55.7	67.5	71.3	73.6	77.3	77.4	74.7

*From company reports to the Texas Railroad Commission. †Based on quarterly estimates. ‡Imported by independent distributors. §Received through suppliers who can furnish either domestic or foreign oil. ¶Mostly duty free for bunkering ships in foreign trade. ‖Unable to forecast.

CRUDE IMPORTS*

(Thousands of barrels daily)

	1954 actual	1955 actual	Per cent change
January	600.8	716.8	19.3
February	609.1	747.3	22.7
March	642.3	721.4	12.3
First quarter	617.7	729.9	17.8
	1954 actual	1955 forecast	Per cent change
April	571.8	†669.4	17.1
May	723.5	731.4	1.0
June	617.5	773.8	25.0
Second quarter	638.5	724.9	13.5
July	678.8	741.1	9.0
August	654.2	750.5	14.7
September	656.0	728.5	11.1
Third quarter	663.1	740.2	11.6

PRODUCT IMPORTS*

(Thousands of barrels daily)

	1954 actual	1955 actual	Per cent change
January	450.5	508.1	12.8
February	482.6	519.0	7.5
March	346.9	451.8	30.2
First quarter	424.8	492.1	15.8
	1954 actual	1955 forecast	Per cent change
April	301.0	†356.9	18.6
May	272.2	310.2	14.0
June	268.8	304.4	13.2
Second quarter	280.6	323.7	15.4
July	254.9	260.6	2.2
August	218.1	264.7	21.4
September	247.8	282.8	14.1
Third quarter	240.2	269.2	12.1

*From company reports to the Texas Railroad Commission. †Actual.

Crude Imports Reach New High

TULSA.—Crude imports reached an all-time high in March, but the seasonal reduction in residual imports held total imports to 1,376,900 bbl. daily compared with 1,404,800 bbl. daily in February.

Receipts of foreign crude averaged 789,700 bbl. daily for a gain of 34,000 bbl. daily or 4.5 per cent over the previous record set in February.

New highs were reported for crude imports from both Venezuela and Canada. Venezuelan crude came in at the rate of 470,900 bbl. daily in March, the first time that crude from this country had exceeded 400,000 bbl. daily.

Imports of Canadian crude averaged 30,000 bbl. daily to set a new record. The recent boost in imports of crude from Canada has been due to the movement to refineries in the Pacific Northwest. West Coast imports from Canada averaged 24,100 bbl. daily in March with the other 5,900 bbl. daily coming into the Great Lakes area. No Canadian crude was shipped into the Pacific Northwest during March of last year.

Biggest increases . . . Gains in Venezuelan and Canadian crudes from a year ago more than accounted for the total increase in imports. Compared with last year, Venezuelan crude was up 79,100 bbl. daily and Canadian crude up 26,400 bbl. daily. Total crude imports in March averaged 83,600 bbl. daily more than in the same month last year.

Crude from the Middle East averaged 221,800 bbl. daily for March, up only 2,700 bbl. daily from last year. Decreases were reported in crude receipts from both Mexico and Colombia.

Residual imports dropped seasonally from the records established in both January and February but climbed 132,300 bbl. daily or 34.4 per cent above the average for March 1954. Imports of other products gained 32,800 bbl. daily or 88.0 per cent over last year. Most of the gain for other products was due to increased imports of asphalt and motor fuel.

Exports of crude and products averaged 278,300 bbl. daily, up slightly from March 1954 but lower than any other month since that time with the exception of September. Compared with February, only distillate and miscellaneous products showed increases in March.

Import-export data are compiled by the Census Bureau of the Department of Commerce.

IMPORTS INTO CONTINENTAL U. S.
(Thousands of barrels)

	Mar. 1955	Feb. 1955	Mar. 1954
Crude—			
Mexico	501	863	796
Colombia	829	568	1,359
Venezuela	14,597	10,993	12,145
Peru	125	120	
Kuwait	3,592	3,927	3,153
Saudi Arabia	2,697	2,276	3,018
Neutral Zone	219	194	
Iraq	367	347	205
Qatar		146	416
Canada	929	569	130
Far East	624	1,100	666
Total crude	24,480	21,103	21,888
Daily average	790	754	706
Products—			
Residual fuel	16,037	16,265	11,934
Other products	2,168	1,965	1,149
Total products	18,205	18,230	13,083
Daily average	587	651	422
Total all oils	42,685	39,333	34,971
Daily average	1,377	1,405	1,128

EXPORTS*

	Mar. 1955	Feb. 1955	Mar. 1954
Crude	771	976	873
Gasoline	1,644	1,695	1,306
Kerosine	178	326	563
Distillate fuel	1,515	870	1,498
Residual fuel	2,255	2,987	2,172
Lube oils	1,191	1,100	1,006
Other products	1,074	907	975
Total all oils	8,628	8,861	8,393
Daily average	278	316	271

*Excludes shipments to territories.

Bay Petroleum Sold

Refining, producing firm acquired by New Yorkers

NEW YORK.—Two New York investors have purchased Bay Petroleum Corp. of Denver, in a deal reportedly exceeding $20 million.

Purchasers were Stone & Webster Securities Corp. and Springbank Oil & Gas Co.

Chester Clark, Stone & Webster vice president, confirmed the purchase. He said the transaction involved acquisition of stock held by Mr. and Mrs. C. U. Bay and certain of their associates totaling about 96 per cent.

Clark added "certain technical steps still need to be taken preparatory to disclosing full details of the matter."

Bay Petroleum was founded and directed by the former U.S. ambassador to Norway. It holds oil production in Kansas, Oklahoma, Texas, Colorado, and Canada. The company operates two refineries—a 12,000-bbl. plant at Denver and a 20,000-bbl. plant at Chalmette, La.

Both refineries have catalytic cracking.

The firm also owns a pipeline gathering system consisting of seven pump stations, 66 miles of 3-in. line and 69 miles of 4-in.

Stone & Webster is a security underwriting, construction, and engineering firm specializing in the utility, petroleum, and chemical industries. Springbank Oil & Gas Co. is owned by White-Weld Co., prominent New York investment and brokerage firm.

Industry Briefs

OKLAHOMA CITY. — The Oklahoma Corporation Commission left the state's oil allowable for June at 522,575 bbl. daily, the same amount it set in May. The production was broken down into 219,287 bbl. daily for allocated fields and 303,288 bbl. daily for unallocated fields.

MOBILE, Ala.—Carbon bisulfide will be made from natural gas and sulfur in a new process to be used at a plant Stauffer Chemical Co. plans to build here. The plant is scheduled to be completed next spring.

TULSA.—The Lun-Dow Co., Inc., has been awarded contract to market the entire output of the Kimball Gas Products Co. gasoline plant at Kimball, Neb. The plant will be completed by mid-August. Lun-Dow, meanwhile, is expanding its sales department to provide greater services to customers in the fertilizer field.

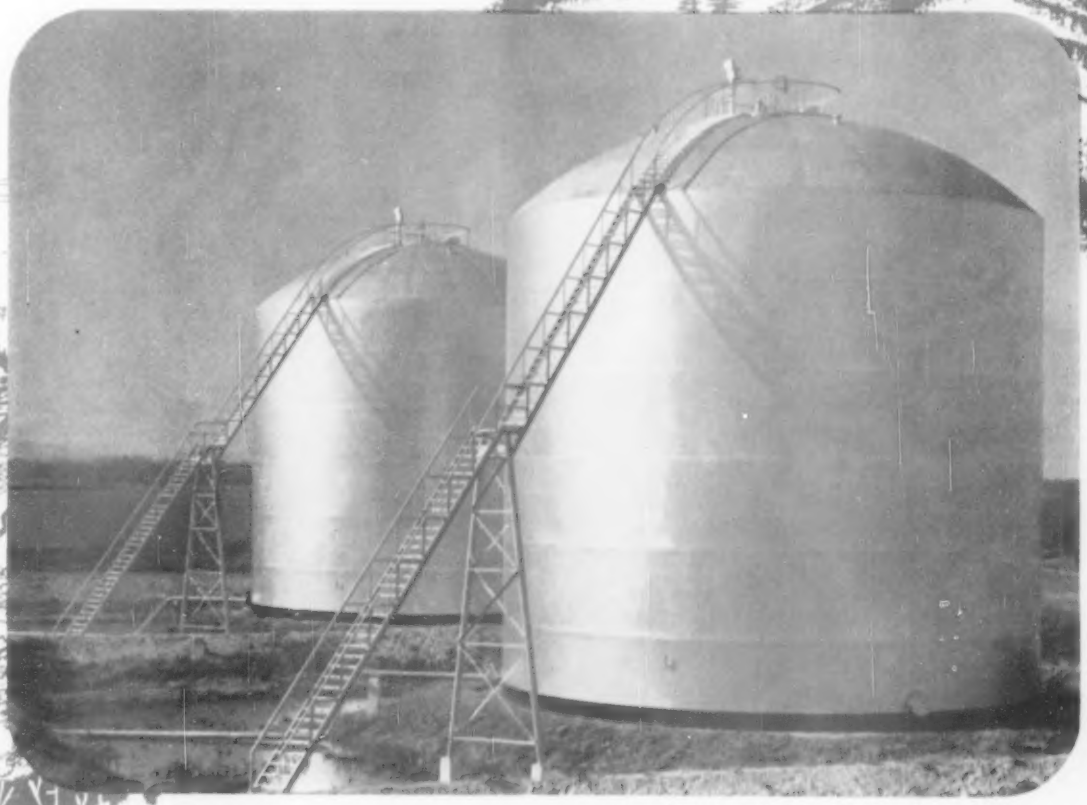
COLUMBUS, Ohio.—Ohio Fuel Gas Co. is completing its Guernsey underground storage field and full operation will start within a few days. The new facility cost more than $3 million and is the seventh such development for the company. Latest work included rehabilitating 37 gas wells for storage purposes, building 29 miles of pipeline, a metering station and installing two 440-hp. compressor engines.

DENVER.—The Colorado Oil and Gas Conservation Commission has ordered 40-acre spacing for oil and gas wells drilled in three more fields. Areas affected include production from the "D" and "J" sands of Muddy Creek field in Adams County and Cliff field in Logan County and the "D" sand of Atwood-East field in Logan County.

HELENA, Mont.—Drilling permits no longer are good indefinitely in Montana. A new order issued by the State Oil and Gas Conservation Commission provides that if drilling is not started within 90 days from the date a permit is issued, the holder must apply for an extension.

STORAGE TIME

in the Green Mountain land



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Huge Demand Gain Seen

Use of oil will double in next 20 years, Holman says in "conservative" forecast; Jersey to limit 1955 imports

NEW YORK.—Oil consumption will triple in Latin America, will rise 60 per cent in the United States, and will climb by 2,000,000 bbl. daily in western Europe during the next 20 years.

This highly optimistic forecast of the industry's future was given May 25 by Eugene Holman, chairman of the board of Standard Oil Co. (N. J.) at the company's annual meeting in Linden, N. J.

Holman said the company's studies foresee a constantly increasing use of oil everywhere during the next two decades. By 1975 the free world probably will be using twice as much as today.

The Jersey Standard predictions were even more bullish than those presented recently by another major international company, Royal Dutch-Shell. A doubling of oil demand by 1980 with a 3 per cent annual gain was forecast by Royal Dutch-Shell in its recent annual report. The company, however, called this a conservative estimate.

What's involved . . . The Jersey Standard board chairman pointed out that oil demand has more than doubled in western Europe since World War II, while coal consumption has risen about 20 per cent.

By 1957, he said, oil probably will be supplying 30 per cent of a much larger energy demand in western Europe.

In Latin America, though oil now supplies more than 70 per cent of the region's energy needs, per capita energy use is very low.

The additional 2,000,000 bbl. daily to be needed by western Europe by 1957 is only slightly less than total production of the Middle East last year, he said. A gain of about the same amount in Latin America means as much more oil as the present daily output of all Venezuela.

"It is more difficult to estimate what consumption in the Middle East, the Far East, and Africa, may be in the next score of years," Holman said.

"In those vast areas containing more than 1 billion people the slightest rise in oil consumption per capita would result in a tremendous increase in total demand."

Holman said the company preferred to be conservative in its forecasts. But, he said, never in his recollection have its long-range predictions been too high. Even the most optimistic hopes have always proved too low.

Foreign peoples and governments are becoming more sympathetic and understanding as to what makes the oil business work, he said. Jersey Standard's foreign affiliates are finding a more encouraging climate in which to carry on its operations.

To cut imports . . . The position of this largest company in the industry was reviewed at the meeting by M. J. Rathbone, president.

As for the most immediate outlook, he said, it was estimated consumption in the United States will rise about 5 per cent in 1955 and foreign consumption about 9 per cent.

Touching on the import controversy, Rathbone said the Jersey companies are restricting their imports of crude during 1955 to the 1954 level, in conformity with the recent cabinet committee policy statement.

Product imports, which are almost entirely heavy fuel oil, since April 1 are being restricted to the same amount as was imported in the last 9 months of 1954, plus 4½ per cent. This percentage is the increase estimated for domestic crude production in 1955 over 1954.

Spending to stay high . . . Investments of the Jersey Standard organization for plants and facilities will continue at a high level in 1955, exceeding 1954 by some 10 per cent, Rathbone said.

In 1954, such investments totaled about $600,000,000, 2 per cent above 1953, and another $164,000,000 was spent for leasing, exploring, dry holes, and other exploration costs charged to income.

During the last 5 years, Jersey affiliates have spent around 2½ billion dollars for plant and equipment facilities.

Shutdown Starts at Rifle

RIFLE, Colo.—The U.S. Bureau of Mines has taken the first step toward shutting down its oil-shale experimental plant here June 30 unless additional funds are allocated by then to continue operation.

Two hundred employes received official discharge notice last week. John H. East, Jr., regional bureau director at Denver, said the notices will be void if they are not followed by a second and final notice June 19. The bureau "has not one dime to continue the Rifle operation without more funds," East said.

The Interior Department and Hoover Commission recently asked the budget bureau to request a new appropriation to explore improved mining practices at Rifle. Budget bureau approval, however, still must get White House and congressional approvals.

And the Rains Came

The flooding Washita River forced Phillips Petroleum Co. to temporarily abandon drilling at its well 1 mile east of Bradley, Okla., in Grady County. The rig was standing in about 15 ft. of water when this photo was taken. Heavy rains soaked most of southern Oklahoma during the latter part of May.

may be obtained by writing our nearest office.

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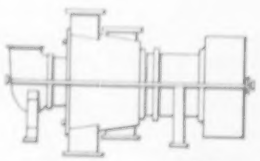


YOU CAN BE SURE...IF IT'S Westinghouse

New christmas tree for . . .

. . . High-Pressure Wells

Edwin McGhee

HOUSTON. — Gulf Coast operators are finding some answers to the problems of equipment for high-pressure wells. But, some questions remain.

On the positive side, one manufacturer last week unveiled a new christmas tree tested at pressures in excess of 30,000 psi. The tree, produced by Oil Center Tool Co., is intended for working pressures in the 15,000-psi. range. A new pressure-energized seal has reduced the over-all weight and size of the tree's components.

This seal, the Laurent "Float Ring," is one of several recently developed in answer to high-pressure well problems. One depends upon matching of closely machined surfaces. The need for these new seals is evident in the fact that no A.P.I specifications exist for flanged connections in working-pressure ranges greater than 10,000 psi.

Already, however, at least one producing well in the Gulf Coast has a shut-in tubing-head pressure of more than 10,000 psi. Moreover, there are reports that formations have been tested with surface flowing pressure greater than 12,000 psi. These wells reportedly have been plugged and temporarily abandoned for lack of equipment to handle their flow.

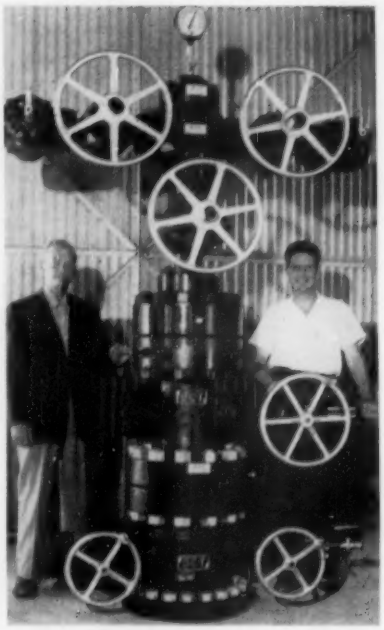
One manufacturer has calculated the size of a single A.P.I.-type flange of 6⅛-in. bore for a working pressure of 15,000 psi. The o.d. of the single flange would be 42 in. Thickness would be 15 9/16 in., and it would weigh 5,940 lb. The mating flanges would have 20 bolts of 2¾-in. diameter.

Tubular goods question . . . With the christmas-tree problem better in hand, the operators are wondering about their tubular goods.

Burst failures in high-yield-strength tubular goods are not too common, but are costly when they do occur in high-pressure wells. This problem was pointed up by Fred Prange of Phillips Petroleum Co., in addressing the Houston chapter of the A.I.M.E. last week.

According to Prange, the problem is one of ductility, since the burst failures in oil-well casing and tubing under high pressures are brittle-type failures. Almost all of them occur at a notch. The notch may be the result of pipe tongs, or it may be a plug score from the mill.

Of course, not all tong-notched tubing is going to burst; but if it is brittle enough and subjected to high pressures, it is a first-class candidate for premature failure.



THIS CHRISTMAS TREE was subjected to a series of tests at pressures above 30,000 psi. At left is H. O. Quebe, director of engineering for Oil Center Tool Co. Also shown is Allen Cochrum, engineer.

The failures occur at low pressures that represent only a fraction of the yield value of the pipe, Prange pointed out. Therefore, doubling the design factor of safety would not even cut the number of failures in half.

Prange called ductility the "neglected dimension" of high-strength pipe. In order to really cut down the brittle or notch failures, he said the operators would have to specify ductility just as they specify minimum yield strength. There is no commonly accepted test for ductility, but Phillips is using, with good results, a "C-ring" test of its own invention.

At Lake Arthur . . . An example of the care that operators give their high-pressure wells is Lake Arthur, La., field.

There, Union Oil & Gas Co. of Louisiana is cementing its oil string all the way to the surface. This is done by running the casing in two sections. The first section is a liner; the second is run and cemented after the first is in place.

Union of Louisiana loads the casing-tubing annulus with heavy mud and then maintains 2,000 psi. on the casing head to reduce the differential across the tubing. Shut-in tubing-head pressure is more than 9,000 psi.

Gas Line to Be Expanded

SHREVEPORT. — Texas Eastern Transmission Corp. plans to increase capacity of its gas-distribution system in the Philadelphia-New Jersey area.

The company and a subsidiary, Texas Eastern Penn-Jersey Transmission Corp., have filed with the Federal Power Commission for a permit to build new pipeline facilities to boost capacity of their systems east of the Oakford, Pa., underground storage reservoir from the present 731,000 M.c.f. to 843,000 M.c.f. a day. The plan involves the shift of 10,000 hp. in compressor units already installed or approved for the Texas Eastern line to the subsidiary's system. Also included is a proposal to build two small loop lines about 11 miles long in the Philadelphia area.

The project would give the companies sufficient delivery capacity in the big metropolitan area to meet anticipated peak gas needs during the coming winter.

Sohio Cuts Kansas Price

WICHITA.—Sohio Petroleum Co. last week cut its posted price for Kansas crude 15 cents a barrel.

Sohio announced it would pay $2.75 a barrel for 40°-gravity crude, with a proportionate cut for crude of lower gravity.

The company takes about 15,000 bbl. daily of Kansas crude, about half of which comes from its own leases. At the weekend, no other companies had met the new price.

Gas-Ratio Test Nears End

CHEYENNE, Wyo.—Core Laboratories, Inc., Dallas, expects to complete testing 615 oil wells in Greater Clareton field of Weston County, Wyoming, by June 15. The firm is determining which wells waste more than 5,000 cu. ft. of natural gas per barrel of oil.

Of 450 wells checked, 88 have been ordered shut in by the Wyoming Oil and Gas Commission, which hired the testing done. One well was found to be producing at a 1,000,000:1 ratio.

After the check is completed, a committee of producers in the Greater Clareton area will decide whether to build a 50 million cubic feet capacity natural-gasoline plant or five smaller plants in the field to process the gas now being flared.

Another amazing case history

WITH *nalco*

CORROSION AND FOULING

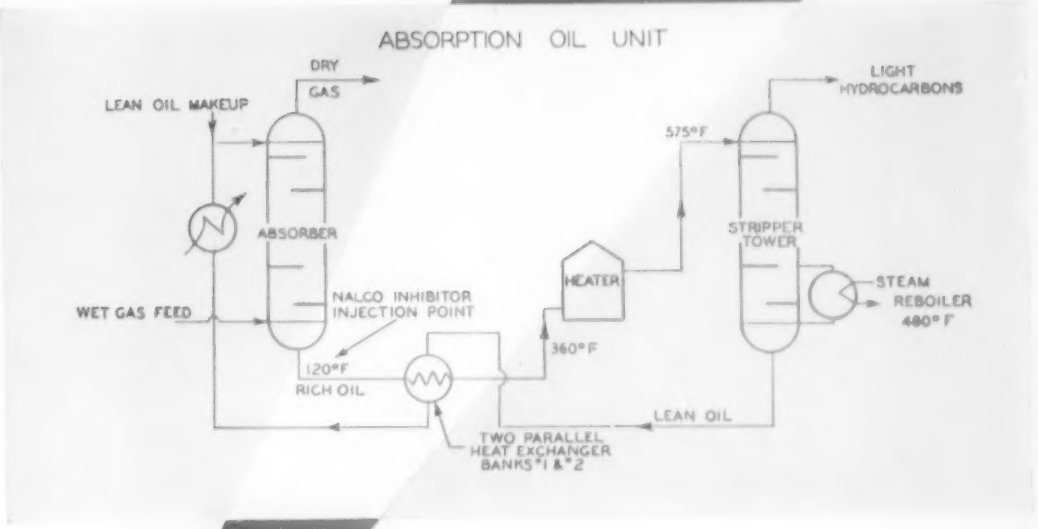
INHIBITORS

THE PROBLEM:

Severe fouling of heat exchangers in a cat cracker absorption oil system where temperatures range up to 575° F.

THE TREATMENT:

Nalco Inhibitor added at 20 parts per million to the absorption oil in the system.



THE RESULT:

Pressure drop across exchanger banks reduced from an average of 95 psi to an average of 12 psi by the detergent-dispersant action of Nalco Inhibitor. And for the first time in plant history, the exchanger banks required *no manual cleaning* after months of operation.

There's more to the story, too—because Nalco Inhibitors were then tried in another absorption system, and performed so successfully they were quickly applied to *thirty* more locations within the refinery. If yours is a similar problem of fouling, corrosion or hydrogen blistering, it will certainly pay you to look into these amazing Nalco Inhibitors. Talk it over with your Nalco Representative or write direct.

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Science Aids Marketer

A.P.I. studies indicate oil companies are relying more on research to help increase sales at service stations

C. O. Willson

ST. LOUIS.—The marketing division of the oil business is going "scientific."

That trend was outstanding at the annual meeting of the marketing division of the American Petroleum Institute held here May 23-25 at the Chase-Park Plaza hotels. More than 500 executives and departmental heads of oil companies, together with representative jobber and dealer organizations were present.

The committee reports and discussions revealed that those responsible for marketing practices are relying more and more on the findings of specialists. These include those with doctorates and master's degrees, an increasing number of whom are either directly employed by oil companies in their marketing departments or are retained as consultants to make studies and advise on special problems. Several of the A.P.I.-sponsored research programs got under way several years ago and are now showing definite results.

Those who are paying the bills, including a number of marketing executives attending this meeting, appear to be well satisfied with the results. Away from the sessions one marketing head said the programs "are ending the rule-of-thumb methods" in marketing which brought about unsatisfactory conditions and have affected the entire oil industry adversely.

Another veteran observer who can remember what he described as the "helter-skelter" marketing practices of the past said: "What we are doing here is gradually getting our marketing house in order. Our research does not consist in getting together physical and chemical facts as . . . in the production, refining and transportation divisions of our industry. It has to do more with human relations applying to oil company associations with jobbers and dealers and through them with tens of millions of customers."

The opinion was also expressed that the scientific approach to the many problems of petroleum marketing does not minimize competition but places the emphasis on efficient and sound practices rather than price. What has been done was credited with the improvement in net returns from marketing last year and the first quarter of this year.

Research . . . The reports made to the marketing research committee which held four half-day sessions during the meeting varied from "Measurement of Service Station Trading Areas" to "A Critical Appraisal of a Touring Service." All were based on surveys and studies that had been made by competent investigators within and outside the industry.

A typical report was made by N. L. Turkevich of the marketing research department of Continental Oil Co., Ponca City, Okla. It had to do with the continued use of the famed "Touraide" service of the company which was inaugurated many years ago. The speaker said it was agreed within the company that it has made more friends for Continental than any other single activity.

But a detailed survey of the users had revealed that the company was not getting maximum returns from a large expenditure. Detailed investigation resulted in the decision to require that requests for the Touraide maps and other information be made only through Continental dealers, thus limiting the service largely to people residing within the Continental marketing area.

"Market research has contributed to management decisions ranging from copy themes for institutional advertising and identification of agents and dealers as main channels of communication between the company and the public to color and marking of barrels, accounting and auditing procedures, format and content of company publications, station maintenance, rental policy, and sales programming," Eugene Comstock, supervisor of marketing research for Standard Oil Co. (Ind.), explained.

Training personnel . . . Considerable emphasis is being placed on the training of personnel in marketing, particularly the operation of bulk and service stations. It was explained that one of the most costly phases of retail marketing is the large turnover in dealers in all parts of the country.

As one phase of the solution of this problem the Marketing Training Council has prepared manuals on service-station operations and opportunities. The view was expressed that several high schools will shortly offer courses in service-station selling.

The sellers of fuel oil are in danger of having the sellers of natural gas do to them what they did to the coal industry a generation ago, according to William F. Briggs, president of the Valley Oil Co., Middletown, Conn. He and others said that some fuel-oil distributors have become careless in their service to customers with the result that many consumers were shifting to natural gas which is now available in the metropolitan centers over most of this country.

Oil companies which continue uneconomical credit practices are likely to get caught with their credit down, according to J. W. Ross and M. L. Rufer of Standard Oil Co. (Ind.). The speakers outlined their own company program which has shifted away from seasonal credit arrangements in dealing with farmers.

It was pointed out at this session and others that sellers of other products were generally strengthening their credit arrangements while oil marketers were increasing their credit sales with larger losses. The case of the supermarkets operating on a cash basis and replacing the old general store with its wide use of customer credit was cited.

Montana Wildcat Tests Gas

CUT BANK, Mont.—Union Oil Co. of California is coring ahead on its rank wildcat in Blackfoot Indian Reservation, Glacier County. Gas was recovered on drill-stem tests in the upper Madison.

Union reported gas recovery averaged 1,070 M.c.f. per day on the second test of the interval from 8,990-9,028 ft. Gas on the first test from 8,956-98 ft. rated 1,740 M.c.f. per day.

The wildcat is 1 Morning Gun in the Disturbed Belt along the Rocky Mountain front in northwest-central Montana *(The Oil and Gas Journal, May 23, page 96)*.

Forced Gas Sales Approved

OKLAHOMA CITY.—Gov. Raymond Gary has signed a controversial bill into law requiring natural-gas companies to sell fuel to Oklahoma landowners to operate irrigation pumps.

The measure was aimed primarily at Phillips Petroleum Co., which Gary said was selling all its gas from the Hugoton field in the Panhandle under contract to out-of-state purchasers. The governor said he expected Phillips to test the new law in court.

Gary declared natural gas was a resource taken from underneath the farms and ranches of Oklahoma and sold to markets in Wisconsin and Michigan. This left farmers in Oklahoma unable to buy gas taken from their own land and needed for pumps to irrigate their rain-starved crops and pastures, he said.

CANADA

Trans-Canada Shift

All-Canadian route may be dropped temporarily in favor of proposal to swing big gas line south of Great Lakes

OTTAWA.—Plans are reported in the making—at high government levels—which would temporarily shelve the costly all-Canadian route for the proposed Trans-Canada pipeline.

The plan, now under consideration in Ottawa, Washington, Toronto, and Edmonton, is said to be a master proposal for distribution and marketing of natural gas.

It calls for a two-way exchange of gas under a 25-year contract between Trans-Canada Pipe Lines, Ltd., and Tennessee Gas Transmission Co., whose lines in the East already are connected with the Trans-Canada system from Niagara to Toronto.

The project would include an initial line south of the Great Lakes to deliver Alberta gas to eastern markets in the United States and Canada.

Canadian Trade Minister C. D. Howe reportedly is pushing the new plan. If adopted, it would open the door for the eventual sale of nearly a billion cubic feet a day of Alberta gas in eastern Canada and the United States. As a result, the all-Canadian line as previously proposed would be shelved for up to 5 years.

First stage of construction would start in 1956. Trans-Canada would build a line from Alberta gas fields to Winnipeg and south to Emerson, Man. In the same year, it would extend its Toronto line to serve Ottawa and Montreal.

Trans-Canada would deliver 500 million cubic feet of gas a day to T.G.T. at Emerson. This supply would cover Trans-Canada's present commitment to Northern Natural Gas Co. of 100 million cubic feet daily for the Minneapolis market.

Involved also would be an option under which Trans-Canada could purchase up to 500 million cubic feet a day from T.G.T. at Niagara. Trans-Canada would use this supply to serve its eastern markets.

Canadian route . . . The second stage of the plan calls for construction within 5 years of the Winnipeg-Toronto section of Trans-Canada's line via the all-Canadian route north of the Great Lakes. Insistence on the all-Canadian route proved the bugaboo which prevented financing of the big line this year.

The time extension on the section of the line across Canada is believed adequate to assure its financing without government aid. This section would cost about $275,000,000.

Once the line across Canada is completed, purchases from T.G.T. at Niagara would cease. The American company would agree to take any excess Alberta gas at the Niagara border up to 150 million cubic feet daily.

A requirement of the entire deal to insure the interests of both Canadian and American consumers and producers would be agreement between the FPC and governments in Washington and Ottawa.

While any deviation from the original Canadian Government's insistence on an all-Canadian route is still considered a touchy point in the capital, it is believed that terms of the new proposal assuring Canadians an early and adequate gas supply may sway the thinking.

Results of the new proposal, if adopted, might include:

. . . Higher prices to Alberta producers, perhaps 2 cents per M.c.f. above the earlier proposal, and a market for 500 million cubic feet of gas per day by the end of 1956.

. . . Possibility of a lower rate for eastern Canadian consumers and an adequate supply of gas next year.

. . . Service within 18 months in Manitoba and Saskatchewan.

. . . Clearance of any need for government subsidization for any part of the project.

U. S. route . . . The deal would require that T.G.T. build a line from Emerson to Mercer, Pa., to connect with its main line now linked with Niagara.

Price of the gas bought from Trans-Canada at Emerson would be about 23 cents per M.c.f.

Trans-Canada would buy up to 500 million cubic feet of gas daily at Niagara at the New York price of about 40 cents. This is slightly under the rate now charged in Toronto.

Delivery, however, would be on a pay-as-you-take basis rather than under the take-or-pay contract which presently holds Toronto prices at 74 cents.

The potential eastern Canadian market is estimated at 200 million feet daily in the first year and up to 350 million feet by the time the all-Canadian route is completed.

The feeling is that Canada's cabinet members are being brought to realize that construction of the all-Canadian route immediately and without government assistance is impossible. Also, increased reserves now indicate that Canada has more than its requirements of gas, so export is advantageous.

Trade Minister Howe has been discussing the proposals in the past few days with pipeline and government officials. It is expected he will convince his cabinet colleagues of the advantages of the new proposals.

The plan now in the talking stage would help open markets immediately for Alberta gas in the East. In addition, it would help clear the way for early distribution of gas in Winnipeg and other western markets.

Prospects seem bright . . . According to some sources, there is a reasonable possibility that the Canadian Government will give the new plan its blessing.

The proposal would keep the all-Canadian route in the picture while removing a major obstacle to Trans-Canada's financing. Failure to obtain financial backing forced Trans-Canada to postpone construction of the line as previously planned.

It is reported that June 17 has been set as the tentative date for a meeting in Ottawa of Prime Minister St. Laurent, Alberta's Premier Manning, Premier Frost of Ontario, Trans-Canada officials, and other interested parties to discuss the proposal.

There is some hope that a general agreement may be reached before that date.

N. E. Tanner, Trans-Canada president, was understood to have discussed the plan with officials in Toronto and Ottawa last week.

Pipeline Contracts Let

REGINA.—Contract for building a 226-mile natural-gas pipeline from Coleville to Prince Albert has been awarded Majestic Contractors, Ltd., of Edmonton by the Saskatchewan Power Corp.

Contract for a distribution system in the city of Prince Albert was let to Banister Construction, Ltd. of Saskatoon.

Plans call for a 116-mile, 14-in. pipeline from Coleville to Saskatoon. The line from Saskatoon to Prince Albert will include a 40-mile, 12-in. line to near Dana and a 70-mile, 10-in. line from there to Prince Albert *(The Oil and Gas Journal, April 18, page 114).*

SOUTHWEST

Texas Allowable Cut Sharply

AUSTIN.—Texas oil production will be throttled down in June and cut still further in July.

The Texas Railroad Commission has fixed producing days during both June and July at 15, one less than permitted in May.

The commission order chops 66,261 bbl. daily for June and 133,480 bbl. daily for July off the 3,109,021 bbl. allowable in effect May 7. The result will be a 3,042,760-bbl. June allowable and 2,975,541-bbl. quota for July.

The reduced allowables reflect mounting stocks of Texas crude oil which are accumulating due to the customary seasonal decline in demand. Bureau of Mines figures showed a gain in state crude stocks of 1,254,000 bbl. during the week ended May 7.

Cuts for June and July, together with the whopping 205,902 bbl. reduction for May, have dropped the state allowable about 340,000 bbl. daily since April.

Flaring probed . . . Gas flaring over the state also received special attention from commissioners during the allowable hearing.

Phillips Petroleum Co. said its Crane gasoline plant in West Texas had flared about 47,000,000 cu. ft. of gas in April mostly due to mechanical trouble. May venting will be about half that volume. Its plant should be able to handle gas resulting from lower production in June and July without flaring.

Commissioner E. O. Thompson asked Carl Jones, Phillips representative, if gas was being flared in Fuhrman field of Andrews County. Jones admitted it was, but added that a gasoline plant now being built by the company would take all this gas by early next year.

Jones explained that excess gas production has resulted from recent fracturing in the 25-year-old field. Another Phillips man, O. P. Nicola, proration engineer, said that fracture jobs in the field stepped up oil production in many instances from 2 to 3 bbl. per well to a potential of up to 200 and 300 bbl. These jobs cost from about $3,000 to $10,000 per well, he said.

Thompson asked if increased production from fracturing stands up. Nicola said production from these wells declines somewhat soon after the operation. Jones added that experience with fracturing wasn't sufficient to determine long-range results. He said Phillips believed in prolonged high production sufficiently, however, to build a plant to handle stepped-up casinghead gas output.

June and July Allowables

District—	June	Change from May 7	July	Change from May 7
1—Southwest	65,436	— 430	64,827	— 1,039
2—Gulf Coast	142,902	— 3,887	138,843	— 7,946
3—Gulf Coast	466,002	— 7,891	457,408	—16,485
4—Southwest	246,006	— 4,328	240,575	— 9,759
5—East Central	47,948	— 557	46,967	— 1,538
6—Outside East Texas	120,792	— 3,035	117,592	— 6,235
6—East Texas field	209,277	— 6,309	203,117	—12,469
7-B—West Central Texas	167,660	— 2,678	164,065	— 6,273
7-C—West Central Texas	210,400	— 4,858	204,661	—10,597
8—West Texas	972,418	—30,643	947,741	—55,320
9—North Texas	278,540	— 2,238	274,513	— 6,265
10—Panhandle	115,379	+ 593	115,232	+ 446
Total	3,042,760	—66,261	2,975,541	—133,480

Unitization Approved

AUSTIN.—The Texas Railroad Commission has approved plans of Cities Service Oil Co. and other operators in multipay Columbus field of Colorado County, West Texas, to unitize the field and conduct pressure-maintenance operations.

The program is expected to recover an extra 6,000,000 bbl. of oil and additional large quantities of gas liquids.

The unit agreement, supported by all operators in the field, covers 14 producing oil and gas zones down to 12,000 ft. and any other zones above this depth which may prove productive in the future. Pressure maintenance, however, will be carried out only in the oil zones.

Primary recovery was estimated at 19.7 to 27.7 per cent of total oil in place and ultimate recovery at 30.7 to 43.2 per cent.

Other operators in the field besides Cities Service are Commercial Petroleum & Transport Co., Sinclair Oil & Gas Co., Texas Gulf Producing Co., and Ralph Fair, Inc.

Phillips Plans Gasoline Plant

ANDREWS, Tex.—Phillips Petroleum Co. will build a natural-gas liquids extraction plant in Andrews County about 3 miles west of here. Initial capacity will be 33 million cubic feet of gas per day.

The new plant will be fed by an extensive natural-gas gathering system. It will serve the Deep Rock, Ellenburger, Fuhrman - Masche, Shafter Lake, San Andres, and other pools in the general area. The plant will be the second built in the county by Phillips and will bring to 11 the number of similar plants operated by the firm in West Texas and southeastern New Mexico.

Canadian Briefs

MONTREAL. — Quebec Ammonia Co. has acquired site for a $10 million, 120-ton per day synthetic-ammonia plant at suburban Varennes. It will be the first such plant in the Montreal area. Canadian Industries, Ltd., is reported planning an ammonia plant at Millhaven, Ont., southwest of Montreal.

VANCOUVER.—Imperial Oil, Ltd., plans a new products pipeline and terminal near here in a move to expand its distributing facilities in British Columbia's lower mainland. The $900,000 expansion includes a 6-mile, 6-in. pipeline across Burrad Inlet linking the new terminal in suburban Burnsby with the Ioco refinery.

OTTAWA. — Two Canadian groups are seeking the right to lease or purchase the section of the Canol pipeline between Skagway, Alaska, and Whitehorse, Yukon Territories. Bills to incorporate separate companies to operate the 4-in. line are pending in the Canadian Senate. Proposed companies are Trans Border Pipeline Co., Ltd., and Yukon Pipelines, Ltd.

EDMONTON.—Canadian Gulf Pipe Line Co. has bought right-of-way, ordered materials, and let contract for a 36-mile crude line connecting Clive and Joffre fields to its facilities at Stettler. Dutton, Williams Bros., Ltd., will construct the 17 miles of 4½-in. gathering lines and 36 miles of 6⅝-in. trunk line.

INTERNATIONAL

Austrian Oil Reclaimed

Western companies may resume large-scale operations in fields surrendered by Russia under recent treaty

WESTERN oil companies eventually may reenter the oil industry in Austria on a large scale.

This could be the outcome of the new state treaty under which the Soviet Union will return oil properties on which foreign companies have a claim. The Austrian Government has not yet decided what to do about the lands.

The treaty forbids ownership of oil concessions by foreigners. But nothing in the treaty prevents western companies from acting as agents of the Austrian Government, with exploration and development rights.

To gain this opportunity for western capital, western negotiators agreed to bar Germany from regaining former assets anywhere in Austria, not merely in eastern Austria which had been under Russian control.

The Austrian finance minister, Dr. Reinhard Kamitz, has said it would be better for Austria to have the help of big international oil companies in the development of the country's restored oil fields. He said that foreigners had offered him "great sums of capital" for investment in Austrian industry. Huge sums of money will be needed to bring the domestic oil industry up to date, he added.

Concession granted . . . Another indication that the Austrian Government may be willing to do business with major oil companies is the fact that Shell obtained a new concession for the development of oil resources in western Austria a month ago.

The most important oil properties at stake under the treaty terms are fields and exploration areas where western companies held long-term concessions prior to 1938. According to an Austrian source, western operators would receive 40 per cent of the country's crude production of 57,000 bbl. daily if concessions were returned to their former owners.

Companies with the biggest interests in Austrian production are Shell and Socony Mobil Oil Co. They jointly owned Rohoelgewinnungs, A.G. (R.A.G.), a company which held an exploration and exploitation concession for the Zisterdorf oil field. Shell and Socony claim the whole of their concession rather than just those areas producing in 1938 when the Germans took over. These older areas are now largely depleted. A Canadian operator, Col. R. K. Van Sickle, is in the same situation on a smaller scale. Standard Oil Co. (N. J.) also held exploration acreage prior to the war.

Refineries . . . Three western companies have interests in Austrian refineries, all of which are in the old Soviet zone. Shell has been operating its refinery at Florisdorf, and Socony its plant at Kagran. The facilities were maintained under adverse conditions, and operations have been closely supervised by the Russians. A third, and larger, refinery at Lobau which is jointly owned by the two companies was completely taken over by the Russians.

Jersey Standard has a 25 per cent share in a fourth, smaller refinery at Korneuberg. Shell also has 25 per cent share in the plant which was taken over by the Russians. Total refinery capacity of Austria is 30,000 bbl. daily.

Field Expanded in Morocco

The Petitjean producing area in French Morocco has been enlarged with the completion of a good well about 1½ miles from Bled Khatara field.

First reports said the well, Zrar 6, had tested 1,000 cubic meters, or about 6,300 bbl. daily, of high-quality crude from a depth of 1,700 m. or about 5,570 ft. However, the well is to be placed on production at a rate considerably below output from the original tests.

The operating company is Cie. Cherifiennes des Petroles. A number of fields have been developed in this Rharb basin, but they are small. The producing area around the new Zrar well has already been defined by unsuccessful tests drilled to the north and south.

Present production from the basin amounts to about 2,500 bbl. daily. The crude is processed at a small refinery at Petitjean.

Spanish Contract Approved

Contract for construction of a products pipeline from Cadiz to Zaragoza, Spain, has been approved by the U.S. Defense Department.

The 600-mile line will be built by Merritt, Chapman & Scott; Benson & Root of Oklahoma City; and Agroman Construction Co., a Spanish firm, under subcontract from Brown-Raymond-Walsh, prime contractor.

Cost of the line will be approximately $5,000,000, plus 485 miles of line pipe to be furnished by the government at a cost of some $5,250,000. The line will be 12 in. for approximately 150 miles from Cadiz, 10 in. from there to Madrid and 8 in. from Madrid to the Zaragoza terminal *(The Oil and Gas Journal, March 14, page 102)*.

Contract for building some 2,441,000 bbl. of storage capacity are still to be let. The line will have 47 steel tanks. Sixteen of them will be of 80,000-bbl. capacity, 21 of 50,000 bbl., 6 of 13,500 bbl., and 4 of 7,500 bbl. They will be located at East Rota, on Cadiz Bay; Seville, Madrid and Zaragoza.

New Sumatra Home for Standard-Vacuum

Indonesian headquarters building is now being built at Palembang, Sumatra, for N. V. Standard-Vacuum Petroleum Mij. Architects' drawing shows louvred, box-like extensions on outside walls to shield windows from direct sun rays. The $1,250,000 structure will accommodate 200 employes. The design permits expansion into an E-shaped building.

Foreign Tools Improve

European oil equipment makers plagued by poor quality, high prices, inefficiency; market hurt by trade barriers

EUROPEAN firms have made great advances in making oil industry equipment. Manufacturers, however, still are plagued by problems of maintaining high quality, of high prices, intra-plant efficiency and trade barriers.

These observations were made in a study report by the Organization for European Economic Cooperation. The study was made by a mission which visited 130 plants in France, United Kingdom, Belgium, Netherlands, West Germany and Italy.

The report showed the European industry has a long way to go before it will reach the stature and efficiency of the industry in the United States. In some instances individual concerns were reported turning out good quality equipment which conforms to A.P.I. standards.

The mission found that Europe now has adequate manufacturing facilities, except for mineral resources. These are more expensive to produce and sometimes poor in quality. But there also is too great a number of manufacturers compared with size of the market. Trade is depressed by frontiers and tariff barriers.

"As a result," the report pointed out, "not only is the consumer unable to purchase the best equipment on the cheapest market but also there is less incentive for manufacturers to maintain frequent contact with one another and reorganize their output on a more rational basis."

Deficiencies noted . . . The European refining industry can find practically all the equipment it needs in Europe, except for very special articles. The demand for these is so small production would not be economic.

Drilling equipment production is less complete. European industry can produce all types of current equipment, including rotaries capable of reaching a 15,000-ft. depth. Production is on a smaller scale than in the United States, and deliveries are slower. However, it is still necessary to buy special safety equipment, instruments, metering and control gear from the United States.

Through the report, a number of deficiencies are called to the attention of manufacturers:

. . . Direct testing in the course of manufacture is less developed than in the United States.

. . . Materials handling inside shops is less developed and congestion is greater.

. . . Fitting and assembly is not efficiently organized, even in the case of equipment which can be fitted in large batches.

. . . Research laboratories are too few. In some plants they are essential for checking motors, pumps and other equipment.

. . . Market is too limited and exports are difficult. This makes it necessary for large firms to go into other production and makes standardization hard to achieve.

. . . Mass production is nearly impossible because too many firms hold licenses from one U. S. concern. In other cases, licensees convert to metric measurements to economize on machining and gaging. This results in spares that are not interchangeable with the original parts.

This is a matter of great importance, the report said. "It is obvious that the big oil companies are hardly likely to purchase equipment in Europe for which they would have to carry separate stocks of spares," it pointed out.

Another serious deficiency is lack of coordination between supplier and user. This is mostly the fault of the manufacturer, the mission found. Manufacturers seldom take the trouble to keep informed of the needs and problems in refining and drilling.

Need Americans . . . In the technical field, the mission found that in actual planning, as distinct from the design of equipment, Europe cannot dispense with assistance of American technicians. But there are several consulting firms which can do design engineering, place orders or superintend work from data supplied by American companies. In cases which do not involve special or new techniques, some of these European consultants also can deal with manufacturing processes.

What's needed . . . Major recommendations in the report call for closer contact between manufacturers themselves and between manufacturers and oil companies. It warned that an interchange of technical information is essential if the industry is to progress. This can be done without disclosing manufacturing secrets.

In the U. S., the publication of information in industry publications and otherwise has made a great pool of information available to all manufacturers.

"In many cases, European manufacturers have still to improve quality and finish of their equipment, particularly by imposing more severe tests and working to closer tolerances," the report said.

Contract Signed for Greece's First Refinery

The Greek Government has awarded a German-American group the contract for construction of a 30,000-bbl. refinery on the waterfront near Piraeus. The plant, costing more than $15,000,000, will be Greece's first refinery. Contract covers erection of the refinery, loading facilities, offices, laboratories, and other facilities. The plant will include an Atlantic Refining Co. Catformer of 8,200 bbl. per day capacity. George Armistead & Co., Washington, aided the government in basic design and specifications of the refinery. The contractor group inc'udes Hydrocarbon Research, Inc., New York, and three German firms—Hydrocarbon Mineraloel Gm.b.H., Fr. Krupp Maschinen und Stahlbau Rheinhausen, and Stahlunion Export Gm.b.H. Shown at contract-signing ceremonies are, left to right, Dr. F. Ringer, Hydrocarbon Research; Dr. K. Birrenbach, Stahlunion; N. Mascio, Hydrocarbon Research; P. Papaligouras, minister of coordination; H. Shaeffer, Krupp; N. Stavropoulos, legal adviser to the minister; A. Protopapadakis, minister of industry; N. Kalantzakos, legal adviser to the ministry; G. Samaras, general director, Ministry of Coordination; A. Baziotis, general director, Ministry of Industry; and F. R. Grant, George Armistead & Co.

Red Deals Renewed

Egypt, Israel sign barter pacts with Soviet Union

EGYPT and Israel have renewed trade agreements with the Soviet Union to buy oil from Iron Curtain countries.

The Egyptian pact calls for a $9,000,000 barter arrangement with Romania and the Soviet Union. Raw cotton and cotton yarn will be exchanged for kerosine and crude oil. This year's agreement appeared smaller than last year's when the Soviet Union and Romania shipped gasoline and industrial and diesel fuel oil instead of crude.

The change to crude oil from products may have resulted because thousands of tons of Iron Curtain petroleum shipments last year were below specifications. These products were re-refined by the Egyptian Government and the Anglo-Egyptian Oil Co., a subsidiary of Shell Oil Co.

Finance Minister Abdel Moneim Kaissouny said the Soviet Union has contracted to send $5,800,000 worth of kerosine and crude in exchange for bales of Karnak long staple cotton and cotton yarn. Balance of the exchange will consist of kerosine from Romania in return for cotton. Last year, Egypt imported about 1,500,000 bbl. of kerosine from Romania and the Soviet Union. This accounted for about two-thirds of Egypt's consumption.

The Israel Government has contracted to buy about 840,000 bbl. of fuel oil and about 360,000 bbl. of crude oil from the Soviet Union, the Israeli embassy announced from Moscow.

The oil, scheduled for delivery by the end of the year, will bring total Israeli purchases of Soviet crude and products since the beginning of 1955 to 368,000 tons, or about 2,650,000 bbl.

Cost of the oil will be covered mainly by the sale to the Soviet Union of 14,000 tons of oranges last season, and additional orange shipments to be negotiated next season.

Feiran Gets New Producer

International Egyptian Oil Co., Inc., has tested its newly completed No. 4 well in Feiran field for an average 700 bbl. daily of 28°-A.P.I. gravity oil. Feiran field, in Egypt's southern Sinai Peninsula, is an International Egyptian discovery.

Tests on the well were made through a ¼-in. choke. Tubing flow pressure was 900 psi. and casing flow pressure over 1,000 psi., according to Southern California Petroleum Corp., a 10 per cent partner in International Egyptian. The location for 5 Feiran is now being graded.

In the company's Belayim field a few miles to the north, the No. 4 well will be spudded this month when a new rig arrives. It is expected to be completed in the 5,100-ft. zone.

Kuwait Sales High

United Kingdom top buyer of crude oil, U. S. second

THE United States was the second ranking importer of Kuwait crude oil in 1954, bringing in an average of 116,900 bbl. daily from the Middle East shaikhdom.

Biggest customer for Kuwait crude was the United Kingdom, which took 397,600 bbl. daily. The United Kingdom also imported 1,300 bbl. daily of distillate.

In addition to total crude exports of 921,400 bbl. daily, about 30,000 bbl. daily was charged to the refinery in Kuwait. Bunker oil for ships was the chief product.

Kuwait crude production reached 952,300 bbl. daily last year. In 1954, the shaikhdom stood fifth in world output behind the United States, Venezuela, Russia and Saudi Arabia. Kuwait Oil Co., Ltd., is owned 50-50 by British Petroleum Co., Ltd., and Gulf Oil Corp.

Socony Posts Crude Prices

Socony-Vacuum Oil Co. of Venezuela has begun posting prices for crude from its San Joaquin and Oficina production.

The company is the third operator to post Venezuelan crude prices. Creole Petroleum Corp. started issuing public price bulletins in July 1952, and Cia. Shell de Venezuela began publishing price lists early this year.

Socony-Vacuum is the fourth largest producer in Venezuela, behind Creole, Shell, and Mene Grande Oil Co. Its current production is around 75,000 bbl. daily.

Prices are f.o.b. Puerto la Cruz. San Joaquin crude is $3.06 per barrel for 42° to 42.9°. Oficina crude is $2.86 per barrel for 34.0° to 34.9° gravity. The company set a 2-cent per degree gravity change for both types of crude.

Desulfurizer on Stream

Shell Refining & Marketing Co., Ltd., has placed its 5,000-bbl. hydrodesulfurization unit on stream at its Stanlow refinery, Cheshire, England.

Lummus Co. built the unit, which removes sulfur compounds and converts them to hydrogen sulfide. The H_2S is then piped to another unit where it is converted into sulfur.

International Briefs

United Overseas Petroleum Co., Ltd., (Unopet), a British member of the Caltex Group, has changed its name to Caltex Services, Ltd. Purpose of the change was to identify the firm with Caltex and to indicate the company's function. The firm serves as a purchasing company for Caltex in the sterling area, recruits British personnel for overseas work, does engineering design work, and handles Caltex contacts with design engineers.

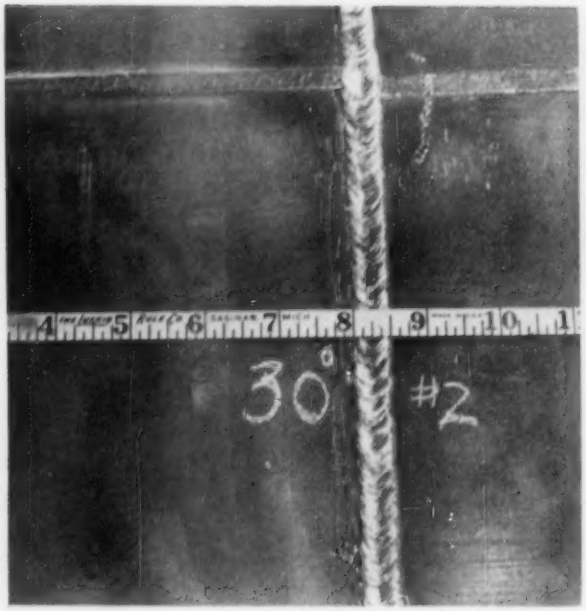
D'Arcy Exploration Co. is drilling its first test well in Flintshire at a location 11 miles southwest of Chester in western England. The well has reached a depth of over 900 ft. A test well also has been spudded at Egmanton, near Sutton-on-Trent, Nottinghamshire. In Plungar field, Leicestershire, the No. 10 well will be tested for oil shows at 2,933 ft. Work has started on the No. 12 well. Plungar 11 will be drilled later.

A 10,000-bbl. daily catalytic cracking unit has gone on stream at the Antwerp refinery of Ste. Industrielle Belge des Petroles, owned 50-50 by British Petroleum Co., Ltd., and Cie. Financiere Belge des Petroles, S.A. (Petrofina). The 40,000-bbl. daily refinery is the largest in Belgium.

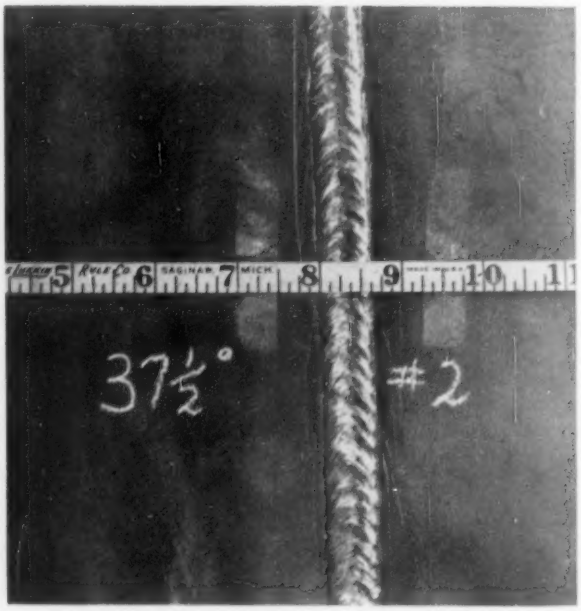
Australia consumed a record high of more than 115,000 bbl. daily of petroleum fuel products in 1954. The Australian minister of development reported 5,775,746 tons of petroleum fuels were used last year against 5,124,535 tons in 1953. Consumption of nonfuel petroleum products was estimated at 350,000 tons for a probable total of all petroleum products of more than 6,100,000 tons. Gasoline use averaged about 61,000 bbl. daily, up 11 per cent over 1953.

Sun Oil Co. has formed an affiliated company in Sweden which will begin operations on June 1. The new firm's name is Sun Oil Swedish Co. Its headquarters will be at Malmo, Sweden.

Iraq's director-general of oil affairs, Mohammed Alnaqib, has arrived at Amman, the capital of Jordan, to help the Jordan Government study offers from foreign concerns. Unidentified American and Swedish oil companies reportedly have submitted proposals to the government on exploration for oil on the east bank of the Jordan River. The offers were said to include the usual 50-50 profit split on any oil found in the country.



YES One big reason for preferring a 30° bevel is the savings in weld metal. This bead measures ½ in. Fig. 1.



NO A completed weld on the same size pipe using 37½° bevel is ⅝ in. wide and requires one-third more metal. Fig. 2.

Northern Natural's Welding Tests Show

30° Pipe Bevel Best for Pipelines

A 30° bevel on line-pipe ends has been used for years. Recently revised A.P.I. Standards now call for 37½° bevel. Tests described in this article show the change to be unwarranted. The smaller bevel results in a better weld and in less welding time. Also by going back to a 30° bevel, the pipeline industry stands to save hundreds of thousands of dollars in cost of welding rod alone.

by L. J. Cunningham* and S. V. Williams†

THE 30° mill bevel for manual shielded metal-arc position welding of pipelines has stood the test of time and has been eminently successful.

Apparently there are some who disagree. The A.P.I. in 1954 adopted the 37½° mill bevel as an industry standard, set forth in Supplement 1, fourth edition of A.P.I. Standard 5LX, February 1954.

Like others in the industry, we are continually studying new methods. We are anxious to find new ways of doing a better job. However, despite the decision of A.P.I. we are still strongly in favor of the 30° mill bevel.

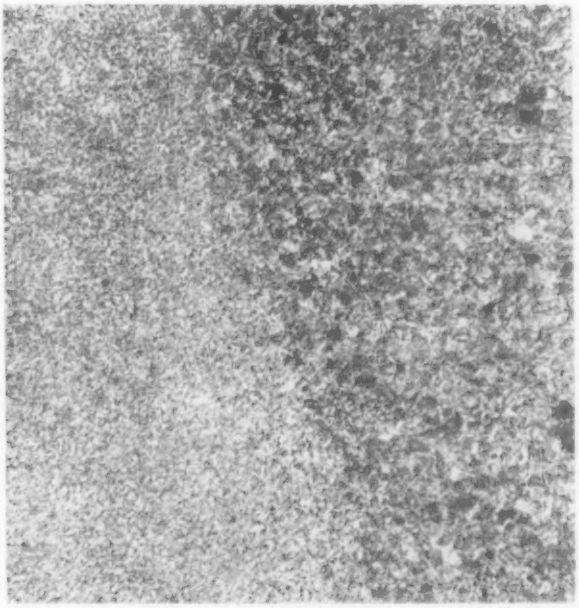
*Assistant superintendent of pipelines, Northern Natural Gas Co., Omaha, †engineering department, University of Omaha.

We have conducted exhaustive tests and the results show to our complete satisfaction that the 30° mill bevel is still the best. A detailed report was made of this test, which was carried out in the engineering department of University of Omaha. A condensed version of this report will be found in this article.

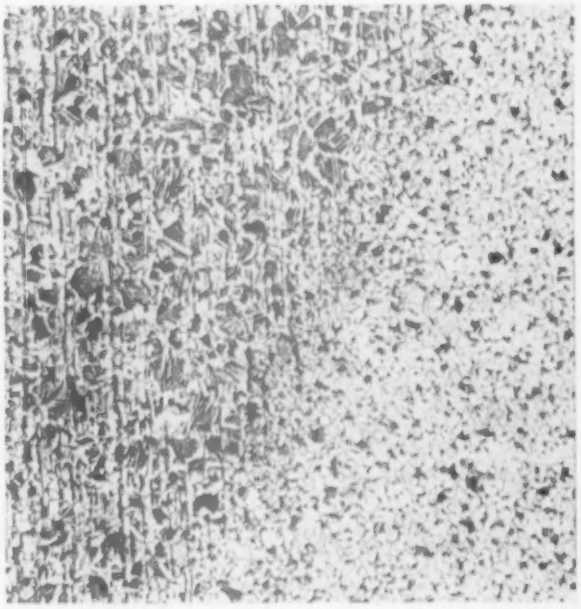
Research on past practice . . . Manual shielded metal-arc welding gave the necessary impetus in 1928 to make transportation of natural gas and oil through long pipelines engineeringly sound and economical. Ten years later in 1938, the American Welding Society published its first edition of its welding handbook. The 30° mill bevel was recommended for shielded metal-arc welding, Chapter 57A, page 919, Fig. 15. This recommendation was made by outstanding authorities in this field, who had used the 30° bevel for shielded manual metal-arc pipeline welding. These same recommendations were carried in the second edition of the A.W.S. handbook issued in 1942, Chapter 41B, page 1509, Fig. 15.

In 1950, 22 years later, the third edition of the A.W.S. handbook changed the 30° mill bevel to 37½°, see Chapter 56, page 1308. This was a "compromise between the older mill bevel angle of 45° and the newer angle of 30°." The older angle of 45° applied only to gas welding—not to the manual shielded metal-arc welding where the 30° mill bevel had been used for 22 years. This can be checked in the first edition of the A.W.S. handbook spoken of above in Chapter 47B on "Gas Welding of Pipelines," a process that now is seldom used on pipe over 2 in. in diameter.

The 37½° mill bevel was a compromise between acetylene and arc



30 Grain structure at the fusion line is much finer with the small bevel. (100 × magnification). Fig. 3.



37½° More and longer heat cycles give a coarse structure with the larger bevel. (100 × magnification). Fig. 4.

welding. Now with acetylene welding no longer used extensively in the industry a compromise is no longer necessary.

Preparation and material for test . . . The pipeline industry was invited to witness the test which was welded at Northern Natural Gas Co. The 30-in. diameter 0.375-in. wall line-pipe nipples complied with the A.S.T.M. standards and the A.P.I. standard for field-welded pipelines.

A.W.S. 7010 welding electrodes were used which complied with the A.P.I. standards and the A.W.S. 7010 specifications.

Procedure used in test . . . The field-welding procedure complied with the A.P.I. recommended procedure. The option of using the same filler electrode throughout, including root pass, was exercised. This practice is followed by Northern Natural Gas on all solid position welded pipelines. Note Table 1.

Preparation and welding of test weld . . . See Table 1.

Type and number of test specimens . . . The type and number of test specimens complied with the A.P.I. standard for the procedure qualification test welds. Two additional cross-sections were taken at each location so that macroetching could be carried out as well as Rockwell B hardness tests. In short, 24 test coupons were taken of each weld, with two welders each making a weld on the 30° and the 37½° bevel in competition as to time and performance.

Removal and preparation of test specimens . . . All specimens were laid out and properly stencil stamped for identification. They were gas cut from the welded pipe nipples by a precision gas-cutting machine designed and manufactured for this purpose.

Each specimen was given the necessary machining to comply with the recommended A.P.I. standards.

Test equipment . . . All destructive tests were made on A.S.T.M. approved testing equipment. Guided-bend tests were made with the correct size plunger according to A.P.I. standards for X46 grade line pipe, 0.375-in. wall.

Test Results

Visual inspection of machined bevels, using precision tools for measuring, showed that the mill bevel was very exact and to A.P.I. specifications. When assembled, a $\frac{1}{16}$-in. opening was maintained with the same external lineup clamp used on both types of mill bevels. The width of groove on outside surface was $\frac{7}{16}$-in. for 30° mill bevel and $\frac{5}{8}$-in. for 37½° mill bevel. See drawing in Table 1.

After welding, this same ratio held, the 30° bevel weld being ½ in. wide and 37½° bevel weld being $\frac{5}{8}$ in. wide. See Figs. 1 and 2.

The total time used by No. 1 welder in making the 30° mill bevel weld was 56 minutes 59 seconds. The same welder used 76 minutes 47 seconds for the 37½° mill bevel weld.

The No. 2 welder used 58 minutes 44 seconds in making the 30° mill-bevel weld compared with 74 minutes 17 seconds for the 37½° mill-bevel weld. An average of the two welders is 30.5 per cent more time for the 37½° mill bevel.

The amount of deposited electrodes showed an average saving of 31.3 per cent in using the 30° mill bevel over the 37½° mill bevel.

The welding beads on the outside surface of the 30° bevel was slightly more rounded. This shows the surface-tension effect of the parent plate on the molten pool of weld metal was greater on the 30° bevel than on the 37½° bevel.

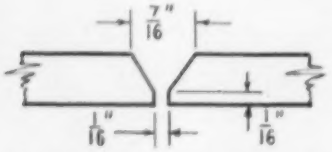
On the inside weld bead, the height of bead was higher on the 30° bevel, and the root pass was thicker and hence stronger. There was less trouble in losing the pool of weld metal. In other words, the chilling effect of parent

"The amount of deposited electrodes showed an average saving of 31.3 per cent in using the 30° mill bevel over the 37½° bevel . . . both types of welds were highly acceptable according to A.P.I. standards."

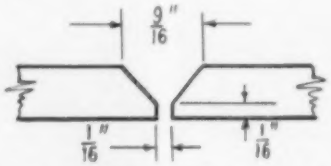
TABLE 1—Preparation and Welding of Test Welds

Welder No. 1: Seykors.
Welder No. 2: Henrickson.
Pipe material: 30-in. diameter, 0.375-in. wall nipple.

Welding machine: 200-amp. motor-driven d.c. generator.
Arc voltage: 24 volts.
Electrodes: Shield Arc 85, A.W.S. 7010, pipe negative.



Material dimensions for Test 30-1 and 2



Material dimensions for Test 37-1 and 2

TESTS USING 30° BEVEL

	Starting time	Bead No.	Electrode size	Amp.	Total time consumed
Welder No. 1 (Weld 30-1)	9:45 a.m.	1	5/32	155	56 minutes
		2	5/32	190	
		3	3/16	190	59 seconds
		4	3/16	190	
		5	3/16	190	
Welder No. 2 (Weld 30-2)	9:56 a.m.	1	5/32	155	58 minutes
		2	5/32	175	44 seconds
		3	3/16	190	
		4	3/16	190	
		5	3/16	190	

MATERIAL USED, WELDER NO. 1, TEST 30-1

Electrodes issued			Stubs left over		Electrodes left over		Deposited metal weight
Number	Size	Weight	Number	Weight	Number	Weight	
35	5/32	3 lb.	25	12 oz.	10	14 oz.	1 lb. 6 oz.
32	3/16	4 lb.	24	11 oz.	8	1 lb.	2 lb. 5 oz.
Total weight deposited							3 lb. 11 oz.

MATERIAL USED, WELDER NO. 2, TEST 30-2

35	5/32	3 lb.	24	10 oz.	11	1 lb.	1 lb. 6 oz.
32	3/16	4 lb.	26	1 lb.	6	11 oz.	2 lb. 5 oz.
Total weight deposited							3 lb. 11 oz.

TESTS USING 37½° BEVEL

	Starting time	Bead No.	Electrode size	Amp.	Total time consumed
Welder No. 1 (Weld 37-1)	1:00 p.m.	1	5/32	*150	
		2	5/32	185	
		3	3/16	195	
		4	3/16	195	
		5	3/16	195	
		6	3/16	195	76 minutes
		7	3/16	195	46 seconds
Welder No. 2 (Weld 37-2)	1:03 p.m.	1	5/32	165	
		2	5/32	180	
		3	3/16	180	
		4	3/16	180	
		5	3/16	180	74 minutes
		6	3/16	180	17 seconds

MATERIAL USED, WELDER NO. 1, TEST 37-1

Electrodes issued			Stubs left over		Electrodes left over		Deposited metal weight
Number	Size	Weight	Number	Weight	Number	Weight	
35	5/32	3 lb.	23	12 oz.	12	1 lb.	1 lb. 4 oz.
40	3/16	5 lb.	38	1 lb. 1 oz.	2	4 oz.	3 lb. 11 oz.
Total weight deposited							4 lb. 15 oz.

MATERIAL USED, WELDER NO. 2, TEST 37-2

35	5/32	3 lb.	22	10 oz.	13	1 lb. 2 oz.	1 lb. 4 oz.
40	3/16	5 lb.	37	1 lb. 2 oz.	3	6 oz.	3 lb. 8 oz.
Total weight deposited							4 lb. 12 oz.

*Reduced after burnthrough.

metal was greater with the 30° bevel than with the 37½° bevel welds. This permits greater buildup.

Both welds presented an acceptable appearance on the outside, with the appearance of the 30° bevel being more regular on the inside.

X-ray negatives showed both types of welds were highly acceptable according to A.P.I. standards and other commercially accepted standards.

The amount of porosity and included slag was singularly and low. The accumulative porosity and slag in the 30° bevel weld was less than that of the 37½° bevel. This was due to the greater tendency to burn through the 37½° bevel.

All 16 tensile tests broke out the parent pipe. All failures were back away from the weld 1½ to 2 in. or more.

Bend tests . . . The bend tests were made with the specimen and guided-bend fixture all at the same temperature. All 16 face-bend specimens meet the requirements. This also applied to the eight root bends on the 30° bevel. One out of the eight root-bend specimens on the 37½° bevel failed. This failure appeared to be at a burnthrough spot, and as all of the other three specimens of this same welder passed, no additional tests were taken. Surface imperfections were more numerous and of greater magnitude in the 37½° bevel welds of both welders than in the 30° bevel.

All 16 nick breaks tests passed the standards with no replacement made. There was no indication of lack of penetrations. The X-ray pictures of the entire welds revealed this same story in a more comprehensive manner.

The 32 specimens macroetched indicated very sound metal for both the parent pipe and the welds made using both the 30° and the 37½° bevel regardless of welder. The greater width of weld and larger area of weld metal on the 37½° bevel shows why greater time and more passes were required on the 37½° bevel over the 30° bevel.

Observation of the macroetch in the affected area of the pipe metal showed a wider zone on the 37½° bevel.

The Rockwell B hardness tests were made with ⅛-in. ball.

The results indicated there was no practical difference in the two bevels or in either welder or in any of the positions in the circumference of each weld. One might have predicted a pattern for the overhead and vertical welding. No such pattern could be established with this test.

Chemical analysis was run to reaffirm the evidence which showed that the chemistry and amount of cold work on all pipe nipples was for all purposes of this test, the same.

Carbon	0.27 to 0.29
Mn	1.05 to 1.17
P	0.0012 to 0.0015
S	0.0022 to 0.0021

Had there been any segregation of any of these elements of a serious extent, the X-ray and physical test would have revealed this.

Course structure . . . A micrographic study was made of the parent plate, the weld-affected area, and the weld metal. This revealed a very satisfactory microstructure for the intended pipeline use in all three areas on both the 30° and the 37½° mill bevel.

Because of more heat cycles, and greater volume of metal used in depositing seven beads on the 37½° weld compared to five beads for the 30° weld, the microstructure on the 37½° weld is much courser. The grains had more time to orient themselves and grow into larger grains or crystals.

For welds on the 30° mill bevel, the volume of the molten pool of weld metal was less. Also the time factor was less since there are fewer repetitions of the cycle. Thus the grains had very little chance to grow into larger crystals, particularly in the recrystallization period of each succeeding pass or application of heat. Hence, this microstructure takes on a very fine grain size. It would have greater resistance to impact at lower temperatures, and greater resistance to fatigue, or the growth of a defect such as fish eyes or incipient flaws.

In this test it was apparent from the micrographic study that no serious delays were encountered and the residual heat continued to build up in 37½° bevel weld more than in 30° bevel. Thus, quenching was less effective and grain growth greater.

While the microstructure of each weld and grain size is considered satisfactory for the use intended, the microstructure or grains of 30° bevel weld deposited metal, pipe metal, and that of the affected area, more nearly approach that of each other. Therefore, for a wide range of service under a wider range of service temperatures, the microstructure or grains of the 30° mill bevel is nearer to perfection in three areas than in the same areas of welds made with the 37½° mill bevel. See photo micrographs, Figs. 3 and 4.

Conclusions

The results of this study show clearly that the quality of field pipeline welds would not be improved by going to a 37½° mill bevel.

This change in the mill bevel angle of +7½° would increase the weight of electrodes required per weld, and the amount of deposited electrode metal by a minimum of 28.8 per cent. This procedure consumes 26.5 per cent more time per weld. There is also a possibility of more time being required due to excessive burnthrough on 37½° mill bevel.

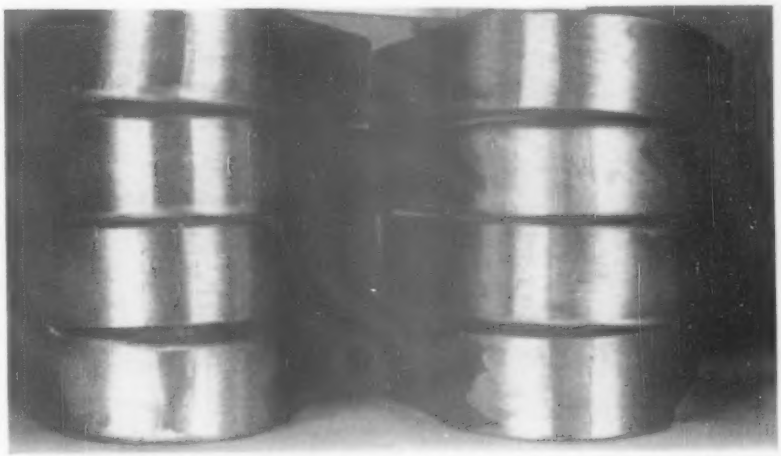
In the name of safety and better quality, changes that can pay their way are always justifiable. This test does not indicate that greater safety or improved quality would be obtained. The facts would indicate the opposite, i.e., the 30° mill bevel is more desirable.

Recommendations

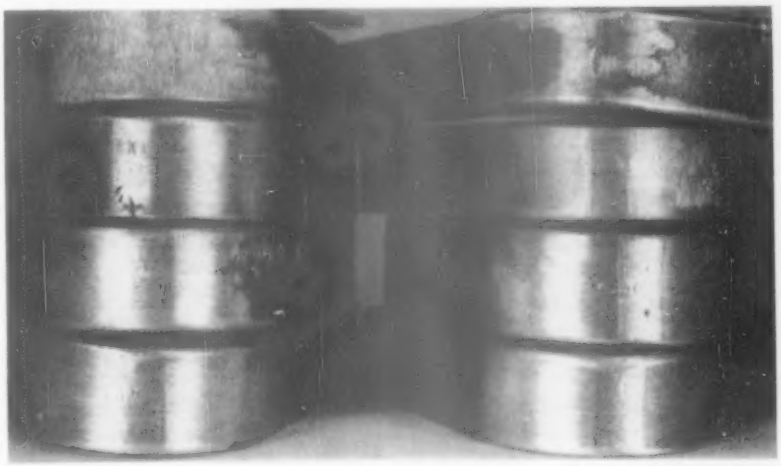
Based on these tests, it is recommended that several mill bevel angles of less than 30° be given similar tests. These tests could establish a tolerance on the best mill bevel which would be more realistic than the ±2½° tolerance proposed.

It is our opinion that with modern machine tools a plus or minus 1° tolerance can be easily achieved by pipe mills. Closer tolerances in mill bevels can materially assist in maintaining high quality and controlling costs.

The added costs brought about by the 37½° bevel are not warranted. Before any change is considered we feel the industry wants documented proof of its value. We feel that sufficient evidence has not been presented to prove the value of the 37½° mill bevel.



ROOT BEND TESTS were made on both welds. Above are specimens from the 30° bevel weld. All passed the test. Fig. 5.

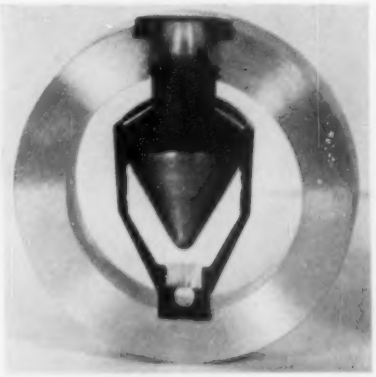


ONE COUPON from the 37½° bevel weld failed in the root bend test, probably due to burnthrough. Fig. 6.

"The 37½° bevel weld required 26.5 per cent more time and could require even more since there is a tendency for excessive burnthrough using the wider bevel."

by R. D. Cocanower

Better Results from SHAPED CHARGES



STANDARD charge positioning in conventional jet gun. Base of charge is set in counterbore opposite port, and charge anchored by washer and sleeve at top. Primacord ferrule next to gun wall at base of charge. Fig. 1.

ROCKET JET GUN charge positioning. Charge is set in counterbore behind the port and is anchored at the base by a spring. The primacord ferrule located in the base of the charge is near center of axis of gun. Fig. 2.

TRENDS in the completion of oil wells through perforations have shown a need for increased hole size of perforations and a more efficient way of perforating wells with six shaped charges per foot. Both requirements have been accomplished with the use of a new charge-positioning technique.

In the past, the usual procedure for shooting six shaped-charge holes per foot has been to lower one gun to the shooting interval loaded four shots per foot and then lower another gun to the same depth loaded two shots per foot.

Difficult problem . . . The development of a jet gun capable of shooting six holes per foot using standard charges was a difficult problem due to the critical relationship between detonating cord speed (primacord) and the explosive front resulting from the charge detonation.

If the primacord distance between two charges was such a length that the time for its detonation was less than the time for the explosive front from the first charge to travel the straight distance to the next charge, the second charge would be forced out of position. This results in gun cutting, poor penetration, and misalignment of all the following charges.

Moving the charges closer together to obtain six shots per foot resulted in interference when the standard method of charge loading (Fig. 1) was used. This method consisted of a counterbore or recess opposite the gun port. The base of the charge was seated in the recess, and further positioning devices of a washer and sleeve were used to hold the charge in an upright position.

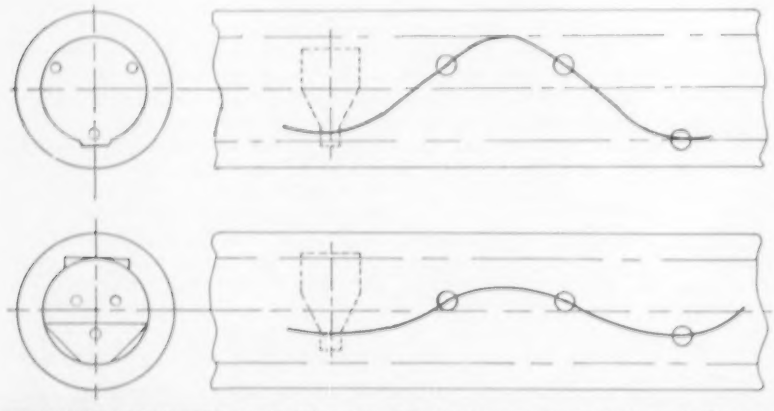
Author is manager of electronics and explosives engineering department, Western Co., Midland, Tex.

Primacord moved . . . The most practical solution to the six-charge per foot problem appeared to be shortening the length of the primacord between charges. This was accomplished by moving the charges forward in the gun. This placed the base of the charges (where primacord contact was made) near the center of the gun rather than near the wall of the gun. The primacord distances between charges was therefore decreased. A sketch of the comparative lengths of primacord for the old and new positioning is shown in Fig. 3.

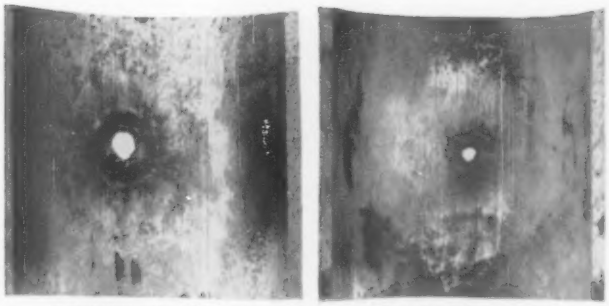
The moving of the charge created the problem of a means of firmly holding the charge in position. This problem was solved by placing a counterbore at the rear of the port and using a retaining spring as illustrated in Fig. 2. Spring loading moves the charge forward within the gun body ½ in., consequently moving the primacord hole at the base of the charge closer to the center line of the gun.

Gun testing . . . The testing of the new gun revealed an increase in entry-hole size in the target and approximately the same penetration as obtained in the standard method of positioning in four-charge per foot guns. The test results showed that the new positioning improved the standard jet charge performance and enabled the use of six-charge per foot guns in all sizes.

Raising the charge within the gun body allowed more space for increasing the explosive behind the cone liner. This would result in increased charge efficiency and increased penetration. Increasing the explosive in the charge, however, lowered the primacord fer-

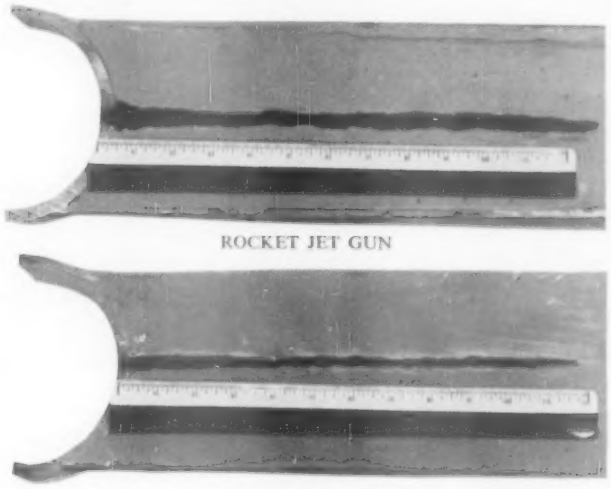


PRIMACORD LENGTH in standard jet gun and Rocket jet gun. In standard gun (top) primacord travels from gun wall to gun wall, thus lengthening primacord between charges. In Rocket jet gun (bottom) primacord ferrules in charges are near center axis of gun, thus reducing length of cord. Fig. 3.



ROCKET JET GUN STANDARD JET GUN

Comparison of entry hole size from Rocket and standard jet guns fired through N80, 5½-in., 20-lb. casing.



ROCKET JET GUN

STANDARD JET GUN

Comparison of hole volume and penetration when the two guns are fired through N80, 5½-in., 20-lb. casing and into neat cement with tensile strength from 500 to 550 psi.

ENTRY HOLE, hole volume, and penetration comparisons. Fig. 4.

MULTIPLE SHOT TESTS. Comparison of entry hole size and penetration of standard jet gun (left) and Rocket jet gun (right) fired into 1-in. mild-steel bars, annealed. Fig. 5.

rule, making a larger charge than standard impractical for use in six-charge per foot guns. This would not affect charge performance in guns containing four charges per foot.

Rocket gun . . . Laboratory tests with a 4-in.-o.d. carrier were conducted using various size charges in an effort to determine the maximum size charge that could be used without interference or excessive carrier wear. From the testing came the development of the Rocket gun. The Rocket charge resulted from increasing the explosive charge density by 2.6 g.

This coupled with the raised positioning gave the following advantages in penetration characteristics over the standard 18-g. charge (used in 4-in. carriers) when fired into test targets (Fig. 4) consisting of a section of N80, 5½-in., 20-lb. casing welded to a section of 5-in. pipe filled with neat cement of a tensile strength from 500-550 psi.

	Standard 4-in. gun	Rocket	Per cent of inc.
Entry-hole diameter, in.	16/64	27/64	68
Entry-hole area, sq. in.	0.049	0.140	186
Penetration, in.	11¾	12¼	8
Hole volume, cu. in.	0.58	1.05	81

Further testing of gun sections using mild steel bars, annealed, submerged in water gave the following results over standard 18-g. charges used in 4-in. carriers (Fig. 5).

	Standard 4-in. gun	Rocket	Per cent of inc.
Entry-hole diameter, in.	20/64	29/64	45
Entry-hole area, sq. in.	0.0767	0.1687	122
Penetration, in.	3.9	4.375	13
Hole volume, ml.	3.0	5.66	89

The resulting increase in hole size of the perforation gives many advantages. A few follow:

1. The larger hole cleans up more easily—mud or other contaminants forced into the perforation are more easily removed.

2. The larger entry hole offers less restriction to flow. High-viscosity fracturing fluids have easier access to the formation. This is especially important where it is desired to create a minimum number of fractures extending a maximum distance from the bore hole. In this case the size of the perforation may become the limiting factor.

Fracturing fluids with high concentrations of mud can be injected into the formation easier. Reservoir oil has easier path to bore hole.

3. More formation area is exposed within the perforation—permeability is increased.

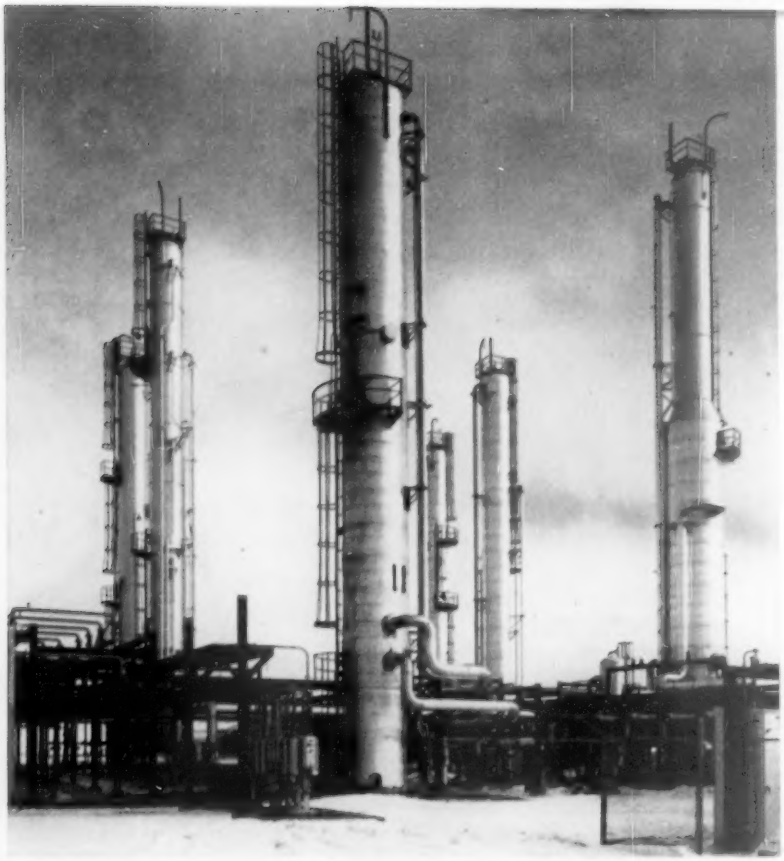
4. It provides complete protection to the casing—available only with a retrievable gun.

5. The retrievable gun gives positive evidence of penetration—a jetted plug means full penetration of casing and formation.

Other guns . . . At present spring-loaded six-charge per foot guns have been designed and field tested in the 4-in.-o.d. carrier and 5-in.-o.d. carrier. The four-charge per foot Rocket gun is now in field use in 4-in.-o.d. carriers and will be available to the oil industry in 5-in. and 3⅛-in.-o.d. carriers soon.

How Weather Affects Design

. . . of a natural-gasoline plant



Rich-oil rectification is accomplished as a two-column operation at the Tioga plant of Signal Oil & Gas Co., employing a reabsorber and deethanizer.

by J. B. Taylor

MANY factors go into the specifications and design of a natural-gasoline plant. These include: field reserves, productivity, anticipated production rates, gas-oil ratios, enrichment of the gas, separation pressures—all the things that aid in determining the economics for building a plant.

When the plant is to be built, then there are local conditions that affect the design: availability of water; weather conditions, including humidity, average temperatures, means, and extremes of wind and rain. All of these factors enter into the design problems. It is these factors related to the weather that are particularly important in the absorption process in the plant at Tioga, N. D.

Tioga is 70 miles east of the Montana border and 40 miles south of the Canadian border, where the closest communities of any size are Williston, 50 miles to the west, and Minot, about 85 miles east of Tioga.

Variable Climate

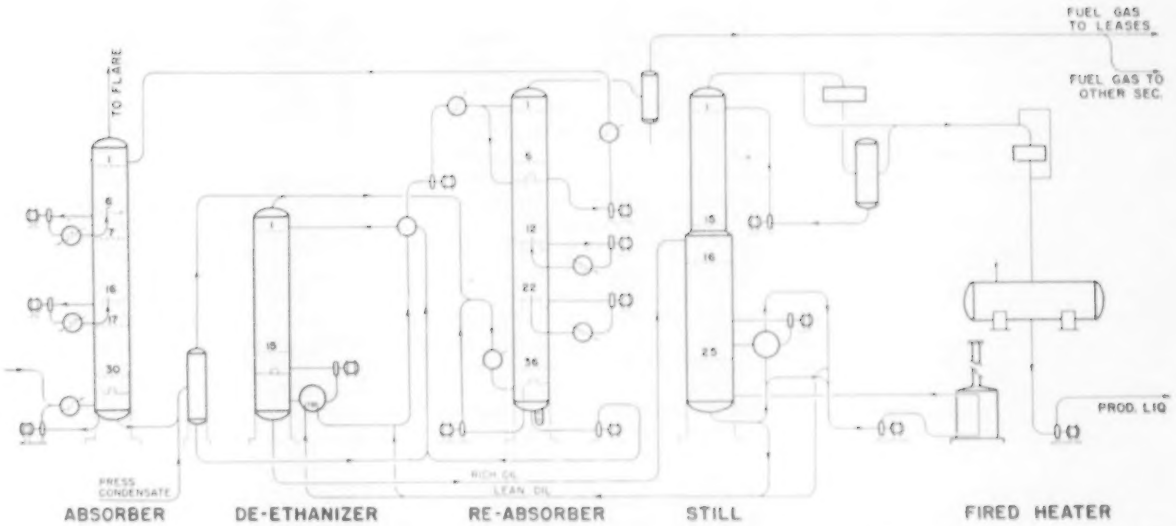
The climate in this particular area is quite variable and runs to extremes. Temperatures of 30° below are not rare in the wintertime and as high as 100° in the summertime. Actually, the extremes registered at Williston show 5 months have record temperatures below —30° and an extreme of —50° F. There are also 5 months with record temperatures above 100° and a maximum of 110° F. The yearly average temperature is 40°, with 5 months of the year that average below 30° F., or freezing. Winds from the southeast prevail in the summertime and from the northwest during the winter.

Author is with Signal Oil & Gas Co., Los Angeles. Paper presented at N.G.A.A. annual meeting, Dallas, April 13-15, 1955.

"Dry" plant . . . With this background of information, particularly that relating to the freezing conditions, it was decided that the gas should be dehydrated before absorption, thus making it possible to operate the absorption plant free of freezing materials, or water. As long as the absorption cycle was free of water and water vapor and the plant was operated on a "dry" basis it was decided to leave all of the process equipment out of doors, or at least the pump equipment and tower bases would not have to be housed to protect them from the hazards of freezeups. Also, it was not necessary to steam trace and insulate many of the lines that would otherwise contain water or water vapor. It should be possible under these conditions to permit temperatures of condensers and other equipment to fall below freezing. Too, shutdowns could be made without danger of freezeups. In order to maintain this as a dry plant it was, of course, necessary to operate the distillation unit on a strictly dry basis.

Blizzards . . . The combination of temperature, wind, and moisture is also responsible for storms of varying natures. When blizzards occur here the snow is whipped by winds so that visibility is reduced to almost zero. Since all of the pumping equipment, regulators, and controlling equipment were to be placed out of doors it was necessary to have a control room where all of the operating conditions could be controlled and observed under the worst weather conditions. In addition to actual control equipment and necessary flow rates, many other operating temperatures and pressures were transmitted to the control room, in order to aid the operator in observing plant conditions.

Water problem . . . A second factor to be given consideration was the lack of water in sufficient quantity for adequate



The Tioga plant design is based on 65 M.M.c.f. of field gas with 90 per cent propane recovery.

cooling. Water wells drilled in the area have small production capacity and in addition, the water requires treatment. Because of this condition aerial units for cooling and condensing are used in all services. The use of water has been restricted to the control of critical services for only such periods as required to maintain reasonable operations during warmest air conditions.

Gas Content

A third factor also related to weather is the content of the wet gas available to the plant. Since the extremes of temperature at the lease separators materially affect the content of the gas entering the plant, the richness varies over a considerable range in the 12-month period. The high propane content of the gas, as shown by analysis, made it economical to consider a high percentage extraction of propane. Being also an area of relatively low temperature, it was expected that the market demand for this product would make it desirable to design for a recovery of 90 per cent of the propane (Table 1).

In order to recover 90 per cent of the available propane, which was desired, large volumes of ethane and methane were also absorbed at 750 lb. Approximately 12 per cent of the wet gas entering the absorber was found to be dissolved in the rich oil. Thus, approximately 7,000 M.c.f. of ethane and methane is discarded in the deethanization of the rich oil from the top of the reabsorber for plant fuel use.

With aerial condensing the degree of deethanization is important during the warmest weather. Inclusion of much ethane in the raw product accumulator would make total condensing difficult during periods when the atmospheric temperature was above 90°. This also precludes the use of vapors or gases for stripping in the distillation unit.

Absorption

Design conditions for the plant are based on 65 M.M.c.f. of field gas at plant intake being raised to 750 psig. for absorption. Gas is purified of H_2S and CO_2 at the first-stage discharge and dehydrated at third-stage discharge, before absorption.

Equilibrium tray . . . Shrinkage through the above units, removing acid gases and condensables, reduces the amount of wet gas to the 750-psi. absorber to approximately 58 M.M.c.f. In order to extract a high ratio of propane, and heavier, it was desirable to keep the temperature rise through the absorber at a minimum. For this reason the wet gas to the absorber is commingled with the oil from the twenty-eighth (bottom) tray of the absorber and passed through an aerial cooler to remove the heat of absorption of the heavy ends.

During summer temperatures the lean-oil circulation approximates 375 g.p.m. Under this condition this so-called "equilibrium tray" at the bottom of the absorber accounts for 4,900,000 B.t.u. per hour in absorbing the heavy hydrocarbons. The combined material is returned to the base of the absorber where the gas is separated to continue through the trays to the top of the absorber.

Absorber intercoolers . . . There are also two intercoolers in the absorber flow design, one below the sixth tray and the second below the sixteenth tray, for removing heat of absorption from

TABLE 1—GAS ANALYSIS, TIOGA PLANT

Separator temperature—	Summer, 80° F.		Winter, 30° F.	
Component—	Mole per cent	G.p.m.	Mole per cent	G.p.m.
Carbon dioxide	1.259		1.347	
Nitrogen	1.399		1.496	
Hydrogen sulfide	2.883		2.962	
Methane	57.577		61.387	
Ethane	16.690		17.311	
Propane	10.405	2.846	9.895	2.707
Isobutane	1.658	0.539	1.292	0.420
Normal butane	4.060	1.273	2.838	0.890
Isopentane	1.213	0.441	0.587	0.213
Normal pentane	1.038	0.374	0.446	0.161
Hexanes	1.282	0.524	0.337	0.138
Heptanes plus	0.536	0.268	0.102	0.051
Total	100.000	6.265	100.000	4.580
Propane at 90 per cent		2.561		2.436
Excess butanes		0.947		1.007
26-lb. gasoline		2.472		0.866
Total		5.980		4.309

the contacting oil stream. The upper intercooler is expected to remove approximately 755,000 B.t.u. per hour and the lower intercooler, 930,000 B.t.u. per hour. The removal of this amount of heat during the absorption process makes it possible to maintain maximum absorption capacity with a minimum of oil circulation. Also, effective column capacity is not reduced by internal reflux conditions.

The rich oil from the base of the absorber is further enriched by adding the pressure condensate which has been dehydrated. This rich-oil stream is then flashed at 300 psig. in the rich-oil flash tank.

Rich-Oil Rectification

The rich-oil rectification is accomplished in two tower sections, one a deethanizer column and the other the reabsorber section. The deethanizer section consists of 20 trays. The rich-oil feed to this column includes the rich oil from the high-pressure flash tank and the rich-oil stream from the base of the reabsorber. This combined oil stream is preheated by exchange with lean oil before entering the top of the deethanizing column.

The oil arriving at the base of the deethanizer column is picked up by circulating pumps which pump the oil from the base of the column through heat exchange, or reboiler, against the hot lean oil from the still.

The oil and flashed vapors are returned to the base of the column where the vapors rise through the 20 trays against the downflowing rich oil, to the top of the column. The heat transfer in the reboiling section is designed for 42,000,000 B.t.u. per hour.

Reabsorber . . . The vapor stream from the top of the deethanizing column is joined with the vapors from the 300-lb. rich-oil flash tank. This combined vapor stream is then joined with the rich oil from the bottom tray (thirty-third) of the reabsorber. This stream then passes through an aerial cooler or equilibrium tray similar to the bottom cooler on the absorber to remove the heat of absorption. It is then returned to the bottom of the reabsorber where the resulting gas and vapors are separated to flow up the reabsorber column. The heat of absorption at the base of the reabsorber approximates 1,500,000 B.t.u. per hour. The rich oil leaving the reabsorber is pumped in with the rich oil from the 300-lb. rich-oil flash tank to the top of the deethanizer column. As mentioned previously, this oil is heated through exchange with the lean oil before entering the top of the deethanizing column. The preheating of this rich oil removes some 12,500,000 B.t.u. per hour from the lean oil.

Two-column operation . . . The combination of these two columns is designed to be able to remove ethane and lighter hydrocarbons from the rich-oil stream, and to retain all of the propane and heavier hydrocarbons. The propane that leaves in the vapor stream from the deethanizing column is in turn recovered in the reabsorber section and returns with the refluxing oil. A single-column operation has actually been divided into two columns.

Sufficient of the lean-oil stream is put over the reabsorber to economically prevent loss of propane in the resulting vapor leaving the reabsorber section.

Reabsorber intercoolers . . . In order to make this reabsorber an efficient column there are also provided intercoolers for removing the heat of absorption at the thirteenth and twenty-third trays. The heat removal here is about 1,100,000 B.t.u. per hour at each cooling unit. These are actually 7 and 17 trays, respectively, from the top of the reabsorber section. The top six trays are a presaturating section for the lean oil that is used in the main absorber. At the presaturator, the heat of absorption of methane and ethane, which is approximately 2,000,000 B.t.u. per hour, is removed from the oil before it enters the main absorber. Also, this absorbed quantity of dry gas is carried to the 750-psi. stage and in consequence reduces the amount of gas that is necessary to be used at the 250-psi. pressure level.

Distillation

The rich oil from the base of the deethanizer column goes directly to the feed tray of the still, which is the sixteenth tray. Since there is a reduction of pressure here from approximately 250 psig. (deethanizer) to 100 psig. on the still, there is some flash at this feed tray.

"Dry" distillation . . . The downflowing oil is removed after the twenty-first tray and circulated through heat exchange transferring 33,000,000 B.t.u. per hour with lean oil from the bottom of the still, to provide a controlled temperature gradient at this point of the column. With a dry distillation, still performance is dependent upon the introduction of sufficient heat to remove all gasoline fractions from the oil and to carry them overhead in vapor form, in the same manner as a fractionation column.

High circulation . . . Heat is introduced at the bottom of the still by circulating the oil from the bottom tray through fired heaters. In order to maintain a low temperature rise of the oil, about 3 gal. of oil is circulated to the furnace for each gallon of actual lean oil circulation used in the main absorber and reabsorber.

This high circulation makes it possible to introduce a high B.t.u. quantity, partly of latent heat at lower outlet temperatures than would result if the same amount of heat at lower circulation rates were to be used.

Total heat load requirements for distillation from the fired heaters is 50,000,000 B.t.u. per hour. An additional 25,000,000-B.t.u. fired heater is provided for heat requirements in the fractionating section of the plant and other plant heating loads. Hot-oil circulation is used to avoid the use of steam.

Since the maximum still loading is encountered during summer periods when the gas is richest with heavy hydrocarbon content, the still design was based on this condition.

Handling pressure condensates . . . As a result, future expansion of distillation capacity may be obtained by removing the pressure condensates from the oil stream. This would reduce the hydrocarbon content of the rich oil to the amount of hydrocarbons in the gas entering the absorber only. By stabilizing the pressure condensates separately, the distillation unit is relieved of handling this hydrocarbon content. By removing the pressure condensates and treating them in this manner, the still is able to handle the equivalent hydrocarbon content by treating additional wet gas volumes.

Control of the end point of the hydrocarbon product is made by refluxing back heavy gasoline fractions from the primary condensers. The unit operates totally condensing.

Stabilizing or separation of the final products is straightforward. Propane is produced overhead from the first column, with all butane and heavier as feed to the second column, where butanes are removed overhead and natural gasoline is produced as a kettle product. The heat load, as mentioned previously, is supplied by a hot-oil circulation from a fired heater.

Acknowledgment

Acknowledgment is given to J. F. Pritchard & Co., of Kansas City, for the design and engineering of the Tioga plant and to Brown & Root, of Houston, for the construction.

"Use of water has been restricted to the control of critical services for only such periods as required to maintain reasonable operations during warmest air conditions."

What's Ahead in Rig Design?

Part 2

In Part 1 of this article, which appeared in last week's issue, the author described three basic types of rigs that featured flexibility, balance, and portability. Here he answers various questions relative to these rig designs.

by R. L. Walker

INDUSTRY experience has supplied definite answers to several questions that often arise in discussing the drilling-rig designs described in the first part of this article. For other questions on design, however, the operator will have to accept compromise answers or go to the manufacturers' drawing boards to examine prototype designs that are being made.

. . . What is meant by proper phase parallel operation of two mud pumps, and what are the advantages of this method of pump operation?

A recent A.S.M.E. paper* dwelt with this subject in some detail.

Volume variation . . . The phase relationship (the position of the cranks or plungers relative to each other) between two duplex pumps operating in parallel (both discharging into the same line) has a definite quantitative effect on the resultant degree of volume and pressure variations or surges.

To illustrate the effect of phase relationship on the volume of two pumps operating in parallel, two templates were made of the fundamental curve of instantaneous rate of flow of a specific 500-hp., 16-in.-stroke duplex pump, and the curves were displaced varying degrees with respect to each other, and the resultant rate-of-flow curves were plotted. From these, the theoretical maximum percentage variation based on maximum volume was determined and is given as Fig. 1.

The curve repeats itself in the reverse direction, since the phase relationship between pumps never exceeds 180°. In this instance, with two 500-hp. pumps operating at the same speed with the same sized liners, either in phase or 90° out of phase, the variation in volume based on maximum will be between 45 and 50 per cent. However, if the same pumps are operating between 130° and 180° out of phase, the variation in volume will be less than 30 per cent.

The resultant curves for conditions where the variation is greatest (0° out of phase) and the variation is least (140° out of phase) are illustrated as Figs. 2 and 3, respectively.

It is seen, then, that by varying the phase relationship by 140° for these 500-hp., 16-in.-stroke pumps with 5-in. liners at 75 s.p.m., the variation in volume may be reduced from a high of 47.7 per cent to a low of 25.7 per cent, an actual percentage reduction of 46 per cent.

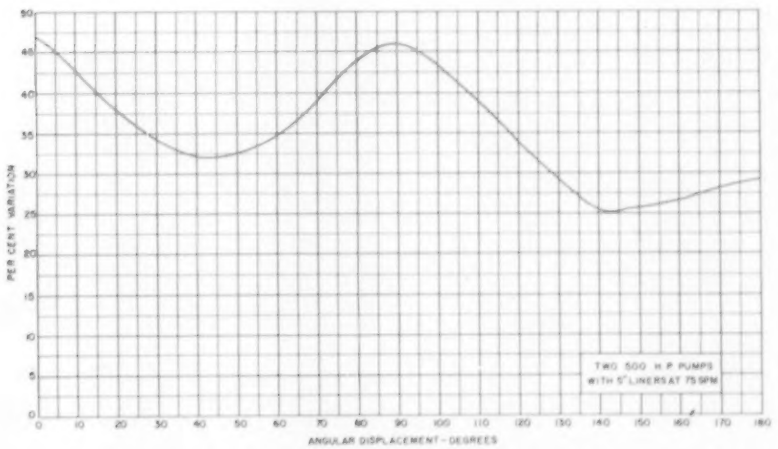
Pressure variation . . . The pressure losses in a hydraulic (mud) system depend on many variables, among them being the rate of flow, density and viscosity of fluid, and the dimensions of the system. The normal hydraulic drilling-rig circuit is composed of long circular paths, short approach nozzles, and an annular, or nearly annular section. It is difficult, therefore, to set up any one empirical equation which establishes the exact relationship, even theoretically, between the rate of flow and pump pressure. However, for a given system, with the same fluid flowing at turbulent rates, the total pressure losses will vary as some power (between 1.5 and 2) of the average rate of flow. It is safe, then, to assume that the characteristic pressure curve for a reciprocating pump will be similar to the characteristic volume curve and that pressure pulses will result both at the pump and throughout the system at the same frequency as, and in some ratio to, the volume variations.

To check this assumption, pressure recordings were taken from the common discharge line of two 500-hp. pumps operating in parallel at varying phase relationship and are shown as Fig. 4.

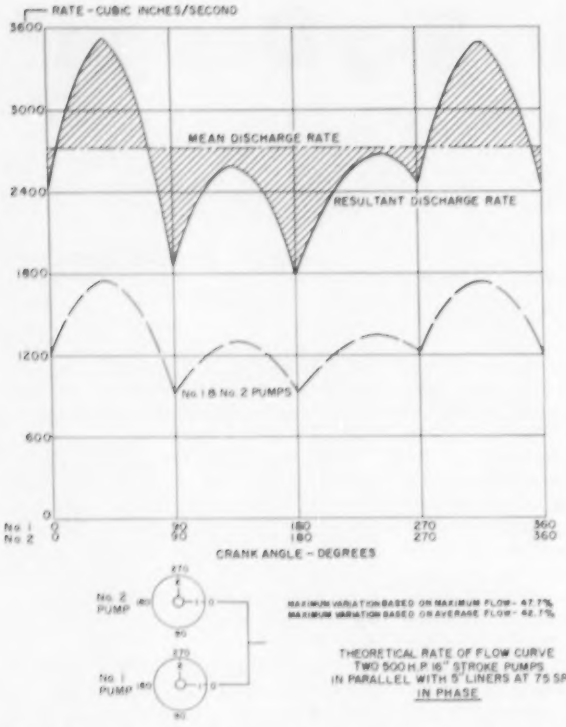
Both pumps were chain driven from a common compound and, consequently, operated at identical speeds. Even after making allowance for the probable effect of such factors as the action of the air chamber, fluid slip, and possible lag in valve opening, a remarkable resemblance in shape is noted between the theoretical volume curves of Figs. 2 and 3, and the respective pressure recordings of the two pumps. The re-

*"Principles of Duplex Slush-Pump Operation," by R. L. Walker and R. A. Tappmeyer, annual A.S.M.E. meeting, Los Angeles, October 1954.

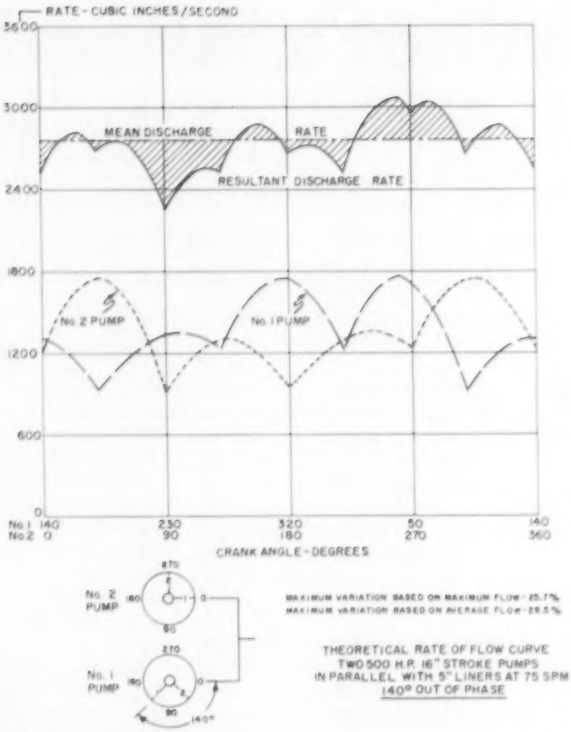
This paper was originally presented before the spring meeting of the Rocky Mountain district, Division of Production, American Petroleum Institute, Casper, Wyo., under the title, "Trends and Thoughts in Drilling-Rig Design." The author is with Shell Oil Co., Denver.



VARIATION IN VOLUME based on maximum will be between 45 and 50 per cent for two 500-hp. pumps in phase or 90° out of phase. Fig. 1.


RATE - CUBIC INCHES/SECOND
MEAN DISCHARGE RATE
RESULTANT DISCHARGE RATE
No. 1 & No. 2 PUMPS
CRANK ANGLE - DEGREES
No. 2 PUMP
No. 1 PUMP
THEORETICAL RATE OF FLOW CURVE
TWO 500 H.P. 16" STROKE PUMPS
IN PARALLEL WITH 5" LINERS AT 75 SPM
IN PHASE

THEORETICAL rate-of-flow curve two pumps in phase. Fig. 2.


RATE - CUBIC INCHES/SECOND
MEAN DISCHARGE RATE
RESULTANT DISCHARGE RATE
No. 2 PUMP
No. 1 PUMP
CRANK ANGLE - DEGREES
THEORETICAL RATE OF FLOW CURVE
TWO 500 H.P. 16" STROKE PUMPS
IN PARALLEL WITH 5" LINERS AT 75 SPM
140° OUT OF PHASE

THEORETICAL rate-of-flow curve two pumps—140° out of phase. Fig. 3.

corded variations in pressure for each phase relationship are illustrated in graphical form as Fig. 5.

The maxima and minima of this curve and the shape are also very similar to those of Fig. 1, the counterpart of this curve based on theoretical volume variations. By varying the phase relationship between the pumps by 140°, in this particular case it is seen that the variation in pressure, based on maximum pressure, is reduced from 31 to 13.5 per cent, a decrease of 56.5 per cent.

The 6,000-12,000-ft. rig is designed to allow ease of proper phase parallel operation of the two mud pumps. See Figs. 4 and 5 of Part 1 of this article.

. . . If torque converters are provided on each engine, are the two-speed drives to each pump necessary?

Referring again to Figs. 4 and 5, in Part 1, if the two-speed drives between the engines and pumps are eliminated, will it be possible through use of torque converters on the engines to provide (1) rated pump speed with three engines compounded on the two pumps and (2) a safe overspeed of a single pump with the liners unchanged if the other pump is required to be removed from the line?

The answer to this question is yes. This feature of engine-converter packages can best be illustrated by reference to a specific example.

It is assumed that two 325-hp. (rated input) slush pumps are powered by three engine - converter units of the speed-horsepower-torque characteristics illustrated in Fig. 6.

At a rated pump speed of 60 s.p.m. these pumps, together in parallel, when equipped with 5-in. liners, have a rated displacement of 293.5 g.p.m. from each pump or 587 g.p.m. from both pumps at 1,610 psi., (550 hydraulic horsepower or 650 mechanical horsepower input, if an 85 per cent over-all pump efficiency is assumed).

Using the familiar horsepower-torque relationship, the required input torque to the pump transmission for a 900-r.p.m. converter output shaft speed may be expressed as follows:

$$T = \frac{5{,}252 \text{ hp.}}{N} = \frac{5{,}252 \times 650}{900}$$

$$= 3{,}800 \text{ lb.-ft.}$$

$$\text{or } \frac{3{,}800 \text{ lb.-ft.}}{3 \text{ engines}} = 1{,}270 \text{ lb.-ft./engine}$$

As seen by the points A and A' on the curves, Fig. 6, this engine satisfies this requirement.

Now let us assume that the pump manufacturer will guarantee his pump service warranty up to 40 per cent overspeed. If one pump has to be removed temporarily from the line, can we satisfy this overspeed condition of the remaining pump, with liners unchanged, with any combination of the available engines placed on the single pump? The answer again is, yes.

From a modification of the Darcy-Weisback* equation and R. J. S. Pigott's† early work, further refined and published as a guide by drilling-bit manufacturers, it can be shown that the resulting pressure from circulating fluid in a drilling-rig circuit may be expressed as follows:

$$P = \frac{K \times G^2}{10^4}$$

where:

P = pressure drop, psi.
G = circulation rate in g.p.m.
K = hydraulic resistance of circuit

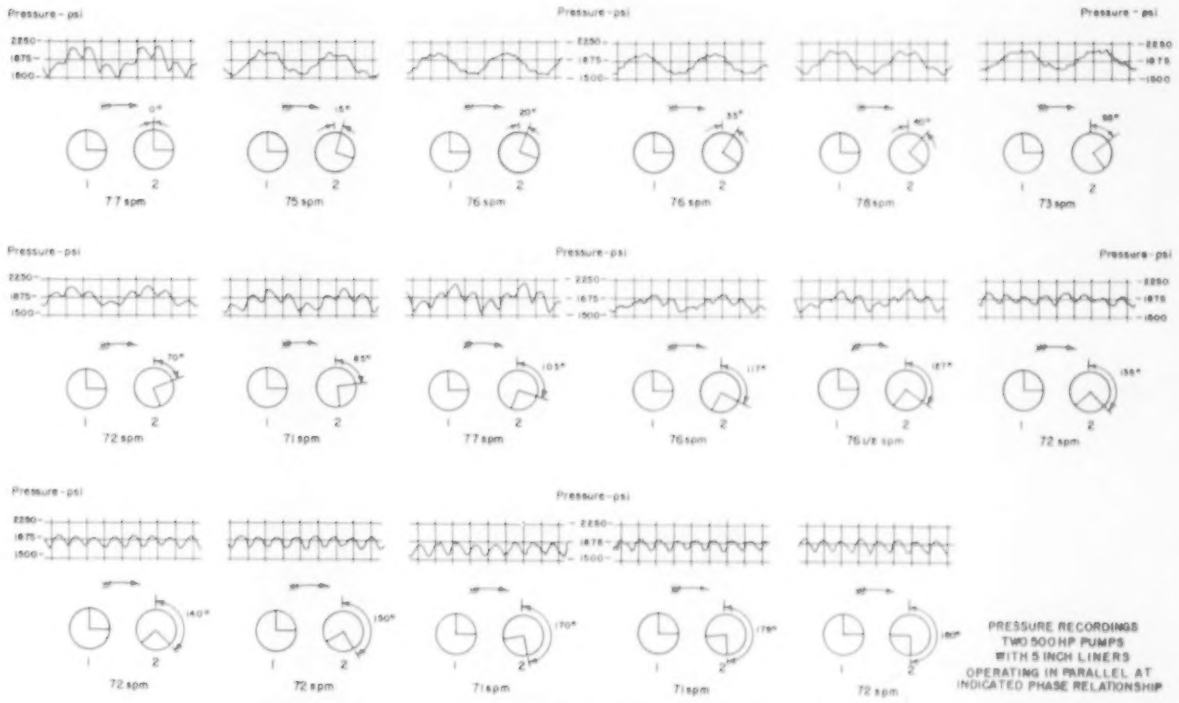
Therefore, if the pressure from circulating a given volume of fluid in a specific drilling-rig circuit is known, the resulting pressure at any other circulation volume for the same circuit may be easily calculated as follows:

$$P_1/P_2 = \frac{(K \times G_1^2)/10^4}{(K \times G_2^2)/10^4} = G_1^2/G_2^2$$

If this single 325-hp. pump is run

*Unpublished report: "Drill Pipe Design and Hydraulic Efficiency in Rotary Drilling," Nov. 17, 1952, by H. W. R. Wardlaw.

†"Mud Flow in Drilling," by R. J. S. Piggott, A.P.I. Drilling and Production Practices, 1941, pp. 91-103.



PRESSURE RECORDINGS taken from the discharge line of two 500-hp. pumps operating in parallel at varying phase relationship. Note similarity between these graphs and Figs. 2 and 3, Fig. 4.

at 40 per cent overspeed the volume displacement = 140 per cent of 293.5 gal., or 411 g.p.m. The resulting pressure from the system using the previously developed relationship is:

$$P_2 = \frac{P_1 \times G_2^2}{G_1^2} = \frac{1{,}610 \times (411)^2}{(587)^2}$$

$$= 786 \text{ psi.}$$

The hydraulic horsepower developed is:

$$\text{H.hp.} = \frac{G \times P}{1{,}714} = \frac{(411)\,(786)}{1{,}714} = 189$$

or the mechanical horsepower input to the system:

$$\text{Mech. hp.} = \frac{189 \text{ H.hp.}}{0.85 \text{ Eff.}} = 221 \text{ hp.}$$

The output shaft speed of the converter at 40 per cent overspeed of the pump = 900 × 1.4 = 1,260 r.p.m.

The required torque to furnish:

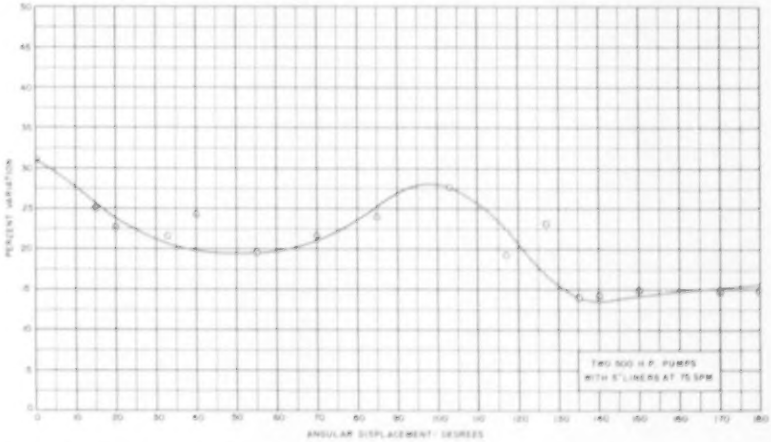
$$221 \text{ hp. at } 1{,}260 \text{ r.p.m.}$$

$$= T = \frac{5{,}252 \times 221}{1{,}260} = 921 \text{ lb.-ft.}$$

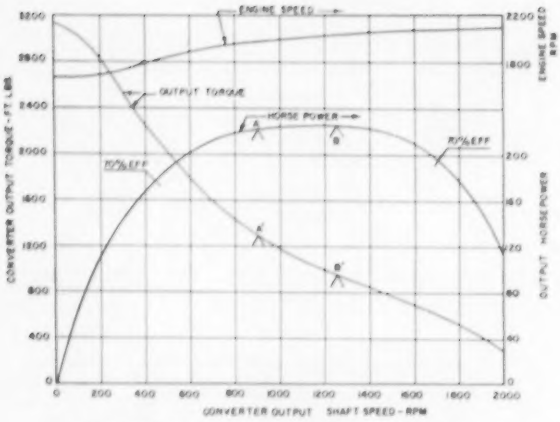
Points B and B' on the graph, Fig. 6, indicate that a single engine of these characteristics will automatically furnish the horsepower and torque to overspeed the pump by 40 per cent provided a temporary emergency requires the removal from the system of one of the two pumps which were previously operating at rated capacity in parallel with 5-in. liners installed.

. . . What has been the experience with universal joints in rig power transmissions, and what are the design features of the universal joints which are available for transmitting the required torque at the necessary speeds?

The rig illustrated as Fig. 3 in Part I has employed a universal jointed drive to the inside 300-hp. pump in the drilling of more than 50 wells without any recorded difficulty. With this rig and other rigs of similar design operated by the author's company, more than 3 years of experience in California have been gained with U-joints working under more adverse load conditions than those experienced by the dual trailer rig. Although design changes have been necessary in the initial U-joints, the U-joint drive can now be considered proved in service and can be designated



ACTUAL PRESSURE VARIATIONS correspond closely to the theoretical values. (Fig. 1). Fig. 5.



THE ENGINE satisfies the requirement. Fig. 6.

as a suitable heavy-duty power-transmission element.

To give detail to universal joints which are in service, torque ratings of two Spicer couplings are listed in Table I.

TABLE I—TORSIONAL CAPACITY

Joint series	Cont. operation (ft.-lb.)	Short dur. oper. (ft.-lb.)	Min. elast. limit (ft.-lb.)
1800	1,250	6,500	11,660
1900	2,400	11,650	20,800

The continuous operation torque rating is that torque which will provide for approximately 10,000 hours of life at 1,000 r.p.m. The short-duration operation is based on that torque load which will provide about 500 hours of life at 100 r.p.m. and is considered to be that load used in starting a unit or the load used under some other unusual short-duration condition.

For a pumping or rotary operation, the Series 1900 U-joint would have a horsepower rating at 1,000 r.p.m. of:

$$\text{Hp.} = \frac{TN}{5{,}252} = \frac{2{,}400 \times 1{,}000}{5{,}252}$$

$$= 457 \text{ hp.}$$

For hoisting, an industrial torque rating of about 1.5 times the continuous rating shown is used. This means that the 1900 series coupling would have a 685-hp. rating for this service.

For greater horsepower applications, either larger U-joints with higher torque capacities must be selected, or higher speed shafts with a shorter joint life expectancy must be provided.

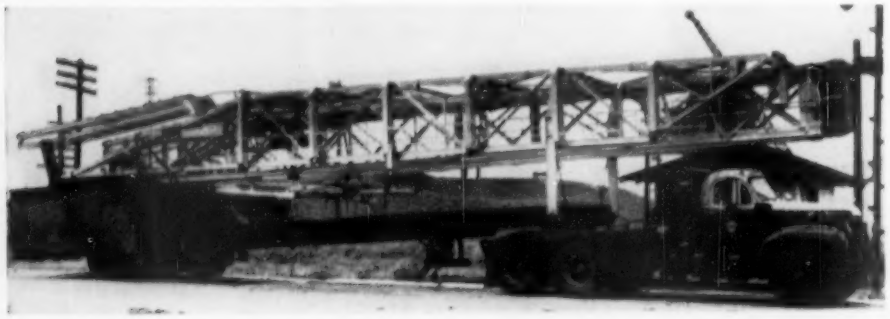
For parallel shafts the manufacturer recommends that a maximum joint angle of 12° not be exceeded where the operating speed is under 1,200 r.p.m.

In selecting U-joints the actual design should be left to an experienced engineer, as load, speed, and angularity are all definite considerations in this design.

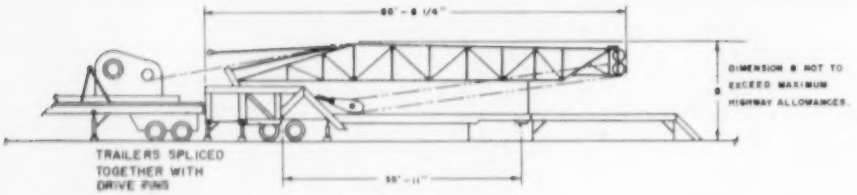
. . . What are the legal load and size specifications for major Rocky Mountain and adjoining oil-producing states, and what are the design considerations which will enable us more closely to meet these specifications?

Although careful consideration has already been given to a load division to give good weight distribution in the shallow and medium-depth drilling rigs which have been proposed (see Part 1), further awareness of this factor becomes mandatory, particularly with the drawworks-rotary trailer. A synopsis of legal (nonpermit) highway load specifications for several oil-producing states in this geographic area appears as Table 2.

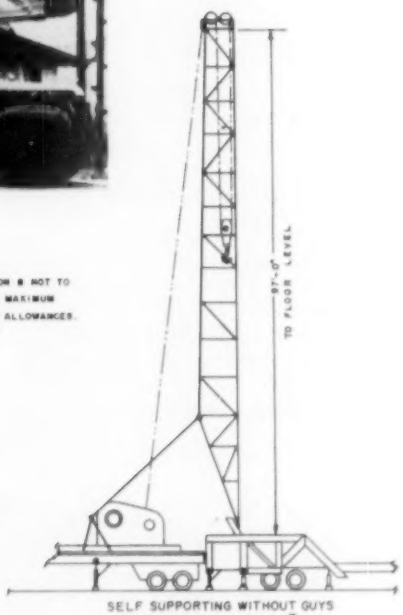
Of course, permits can be obtained for moving loads which do not meet these requirements. These permits often result in delayed or longer, more expensive moves. Needless to say, it must also be kept in mind that there are practical limits beyond which loads cannot be moved, even with permits. It is



DOUBLE TELESCOPING MAST must meet state highway specifications for load limits and dimensions. Fig. 7.



TOP SECTION EXTENDED AND GIN POLES RAISED BY DRAWWORKS



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HOOK CAPACITY 225,000#

advisable, therefore, where possible, to stay within, or as near as practicable, to the limits specified by various highway laws.

Past experience has proved that loads up to 10 ft. in width can be moved, with a permit, during prescribed hours in most states without resort to a highway escort. Draw works, capable of drilling to 10,000-12,000 ft., are available in this width provided removable hub-mounted catheads are furnished. Electric or water auxiliary brakes, of course, must be integrally built into the draw works or be chain driven.

It appears that further careful planning during the design and rig construction phases would make possible further weight reductions in the draw-works-rotary-trailer unit. In the past, the trailer normally has been built as one unit and the draw works as another with the two being adjoined later. This has been the case since the draw-works manufacturer, out of long practice, has used the skids as an assembly base and has mounted component equipment therein. It is believed that a coordinated design would accomplish the same purpose if properly spaced main trailer beams of a preassembled trailer were used as draw-works assembly members. This would result in effective weight reduction by elimination of the heavy draw-works beams.

TABLE 2—LEGAL HIGHWAY-LOAD SPECIFICATIONS
(Gross weight determined by formula or by table of axle spacing)

State—	Width (in.)	Height (ft.)	Length tractor-semitrailer (ft.)	Minimum tandem axle spacing (ft.)	Gross weight per axle (1,000 lb.)	Practical gross weight limits (1,000 lb.) Four-wheel truck four-wheel trailer	Four wheel truck six wheel trailer
Colorado	96	12½	60	40	18	72	73.6
Montana	96	13½	60	40	18	72	76.8
Oklahoma	96	13½	50	40	18	60	60.0
Texas	96	13½	45	40	18	58.4	58.4
Wyoming	96	13	60	40	18	72	73.9

Colorado: Practical gross weight limits = 800 (L + 40) where L = distance in feet between first and last axles of group of axles considered.

Montana: Gross weights graduated from 32,000 lb. if axle spacing is 4 ft. to 76,800 lb. if spacing is 57 ft. or more.

Oklahoma: Gross weights graduated from 32,000 lb. if axle spacing is 4 ft. to 60,000 lb. if spacing is 39 ft. or more.

Texas: Gross weights graduated from 32,000 lb. if axle spacing is 4 ft. to 58,420 lb. if spacing is 41 ft. or more.

Wyoming: Gross weights graduated from 32,000 lb. if axle spacing is 4 ft. to 73,950 lb. if spacing is 57 ft. or more.

Other design thinking, with weight and size of heavy loads as primary considerations, is reflected in the succeeding section on mast design.

. . . What type of portable mast can be provided to be legally moved on the mast trailer without disassembly or with a minimum of disassembly?

Doubles mast . . . Features of the doubles telescoping mast of the double-trailer rig, as shown in Part 1, Fig. 3, are shown more in detail in Fig. 7.

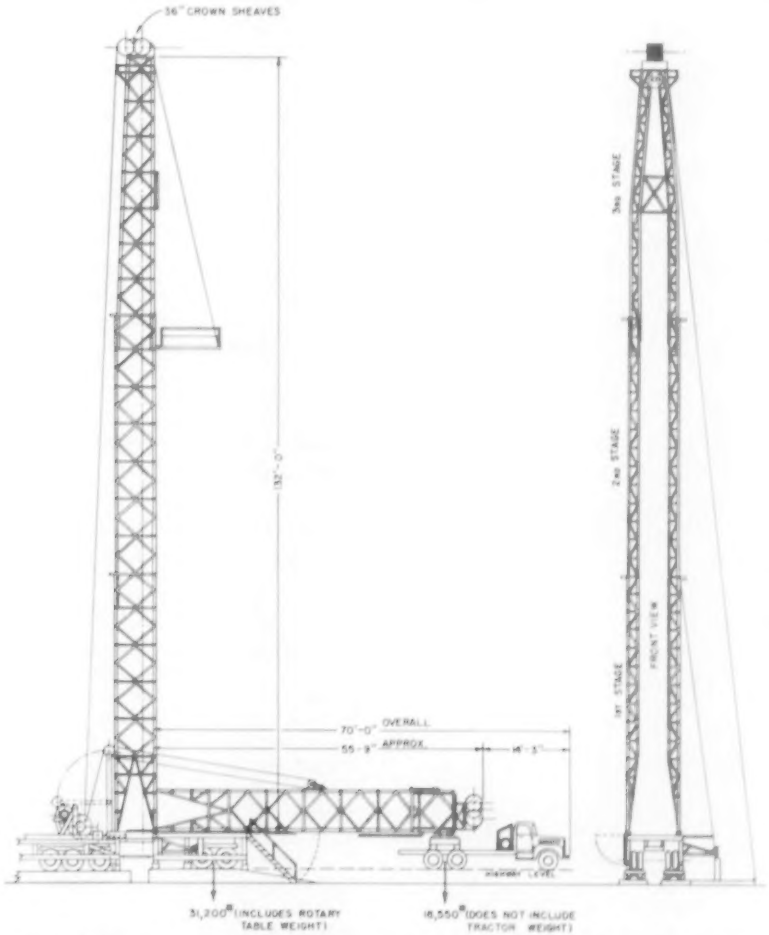
This 97-ft. telescoping mast which has a hook-load capacity of 225,000 lb. will rack 7,200 ft. of 4½-in. drill pipe. Round trips, with adequate engine-converter package horsepower for hoisting, have been timed at less than 4½ hours from a depth of 7,000 ft. However, at this depth racking fingers and floor space are at capacity for a portable rig of permit road weight.

Thribbles mast . . . There has been one thribbles trailer mounted portable mast placed in service in 1953 (Fig. 8).

This 132-ft., three-stage mast telescopes in the vertical position, has a highway width of 10 ft. and a highway height of 13 ft. 6 in. (can be lowered if this does not meet legal limits in the operating state by lowering the substructure). The weight of this mast, whose vertical members are of U. S. Steel Man-Ten steel for high strength and light weight, is 36,632 lb. and, together with the trailer, weighs 49,750 lb. with axle load distribution as shown.

The manufacturer's A.P.I. gross column capacity rating is 590,000 lb., and his hook-load capacity rating is 390,000 lb. with eight lines.

This mast has been used with 4½-in. drill pipe to a depth of 9,300 ft. and has a racking capacity of 12,500 ft. of 4½-in. pipe.



THIS PORTABLE three-stage derrick has handled 9,300 ft. of 4½-in. drill pipe. Fig. 8.

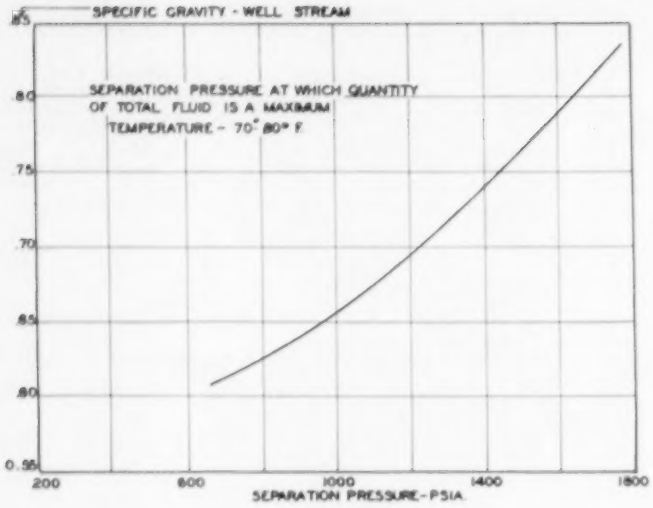


Fig. 1.

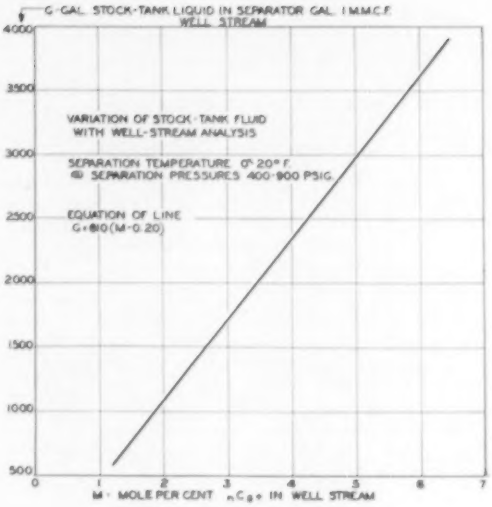


Fig. 3.

ELEMENTS OF FIELD PROCESSING

How Well-Stream Composition Affects Degree of Separation

Part 4 of a Series

by John M. Campbell

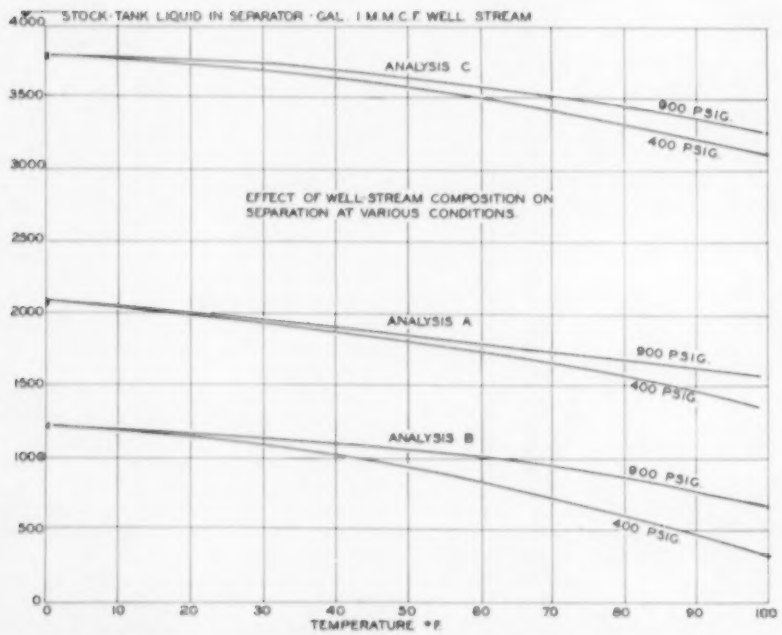


Fig. 2—Effect of composition and temperature on quantity of stock-tank fluid.

The Author Says

- The mole percentage of n-pentane plus in the well stream is the prime composition factor determining the quantity of stock-tank fluid in the separator.
- The pressure at which the maximum amount of total separator fluid is obtained, may be correlated against the specific gravity of the wellstream.
- Below 20° F. composition is the prime factor affecting the quantity of stock-tank fluid in the separator.
- Any increase in recovery due to lowering temperature depends on the well-stream composition.

WELL-STREAM composition is the third and equally important variable affecting the degree of separation between oil and gas. In any given separation problem its effect may never be completely separated from temperature and pressure effects (discussed in Parts 2 and 3), but it is enlightening to consider the effect of composition when all other factors are constant.

Composition is, of course, the basic variable that determines how much potential liquid is available and the economics of producing a given product. A complete analysis of the effect of composition requires that the

Author is with department of petroleum engineering, University of Oklahoma, Norman, and is consulting engineer.

amounts of the various components be known. This entails sampling and analysis by low-temperature fractional, spectrographic, or equivalent method.

For normal separation it is desirable to know the percentage of methane, ethane, propane, isobutane, normal butane, isopentane, normal pentane, hexane, and the heptanes plus fraction as well as the molecular weight and specific gravity of these latter "heavier ends." Often it is more convenient to sample and analyze the liquid and gas from a separator rather than the incoming well stream. In this case it is also necessary to determine the gas-oil ratio, pressure, and temperature in the separator so that a composite well-stream analysis may be calculated.

Other data . . . Obtaining the above component analysis is relatively expensive, particularly if a large number of wells are involved. Consequently, data from other sources may often be employed for preliminary calculations. Data of this type include that from N.G.A.A. and C.N.G.A. charcoal and compression tests and specific gravity determinations. Data of these types must be used with caution for they often prove misleading.

The results of such tests are usually expressed in gal. per M.c.f. (gallons of total liquid per 1,000 standard cubic feet). The N.G.A.A. compression and charcoal tests supposedly purport the amount of stock-tank gasoline present in the gas stream. Either will serve as a preliminary test and to a full-scale program.

As in previous installments, the scope here is limited to the production of stock-tank fluid. Such fluid is normally composed primarily of the pentanes plus. Therefore it is natural that the quantity of such components present in the well stream would have a strong influence on the quantity of stock-tank fluid.

The richness of a well stream is often expressed in gal. per M.c.f. of propane plus which does not necessarily reflect the amount of recoverable liquid. Casing-head gas, for example, often contains large quantities of propane yet the recoverable liquid is quite small.

The total quantity of separator fluid may often be expressed as a function of the well-stream specific gravity. Fig. 1 shows the pressure at which the maximum quantity of separator liquid is obtained for a given specific gravity well stream. The curve shown indicates the average value obtained from a number of well-stream analyses with an average deviation of ±5 per cent. The curve shown has application where maximum removal of liquids is important and serves to show the combined effects of pressure and composition.

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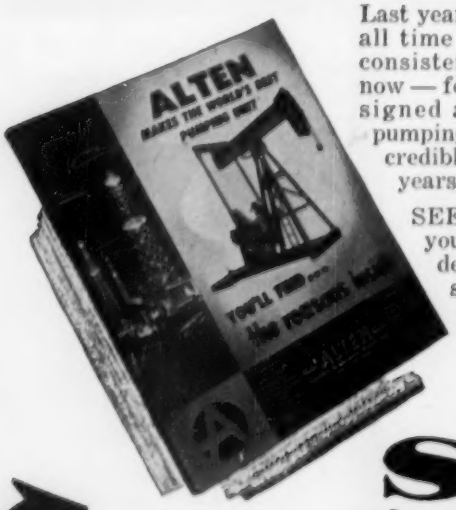

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TABLE 1

Component—	Mole per cent — Analysis A	Analysis B	Analysis C
Methane	71.18	70.01	73.54
Ethane	15.03	15.03	15.03
Profpane	4.78	7.42	1.20
Isobutane	1.04	1.04	0.87
N-butane	3.43	3.43	2.73
Isopentane	0.96	0.96	0.36
N-pentane	1.14	1.14	0.45
Hexane	0.92	0.63	1.04
Heptanes plus	1.52	0.34	4.78
	100.00	100.00	100.00
Gal./M.c.f. C_3+	4.64	4.64	4.64
Mole. % n-C_5+	3.58	2.11	6.27
Mole. wt. C_7+	115	115	115
Sp. gr. C_7+	0.71	0.71	0.71

Effect of composition . . . In order to illustrate the effect of composition, three analyses have been chosen. These are shown in Table 1. In each case the gal. per M.c.f. of the propane plus fraction is the same although the pentane-plus fraction varies markedly. In each case the pentane plus fraction is assumed to have the properties of octane.

Fig. 2 summarizes the quantity of stock-tank fluid obtained in the separator for various separation conditions. The curves obtained are typical of those for any analysis. Several conclusions may be drawn from examination of these curves.

Although the gal. per M.c.f. of the propanes plus is the same, the recovery varies markedly and would appear to be some function of the quantity of pentanes plus.

Below 40° F., and particularly below 20° F., the curves are quite flat. Also, below 20° F. the recovery for a given gas is practically the same regardless of whether the pressure is 400 or 900 psig. Above 20° F. pressure begins exerting an effect on recovery.

The results shown in Fig. 2 are typical of those obtained with a large number of analyses. These may then be used to predict the effect of temperature, pressure, and composition on separation.

The effect of composition on the quantity of separator stock-tank fluid below 20° F. may be expressed by Fig. 3, where the prime variable is the mole per cent normal pentane plus in the well stream. The equation of this line is

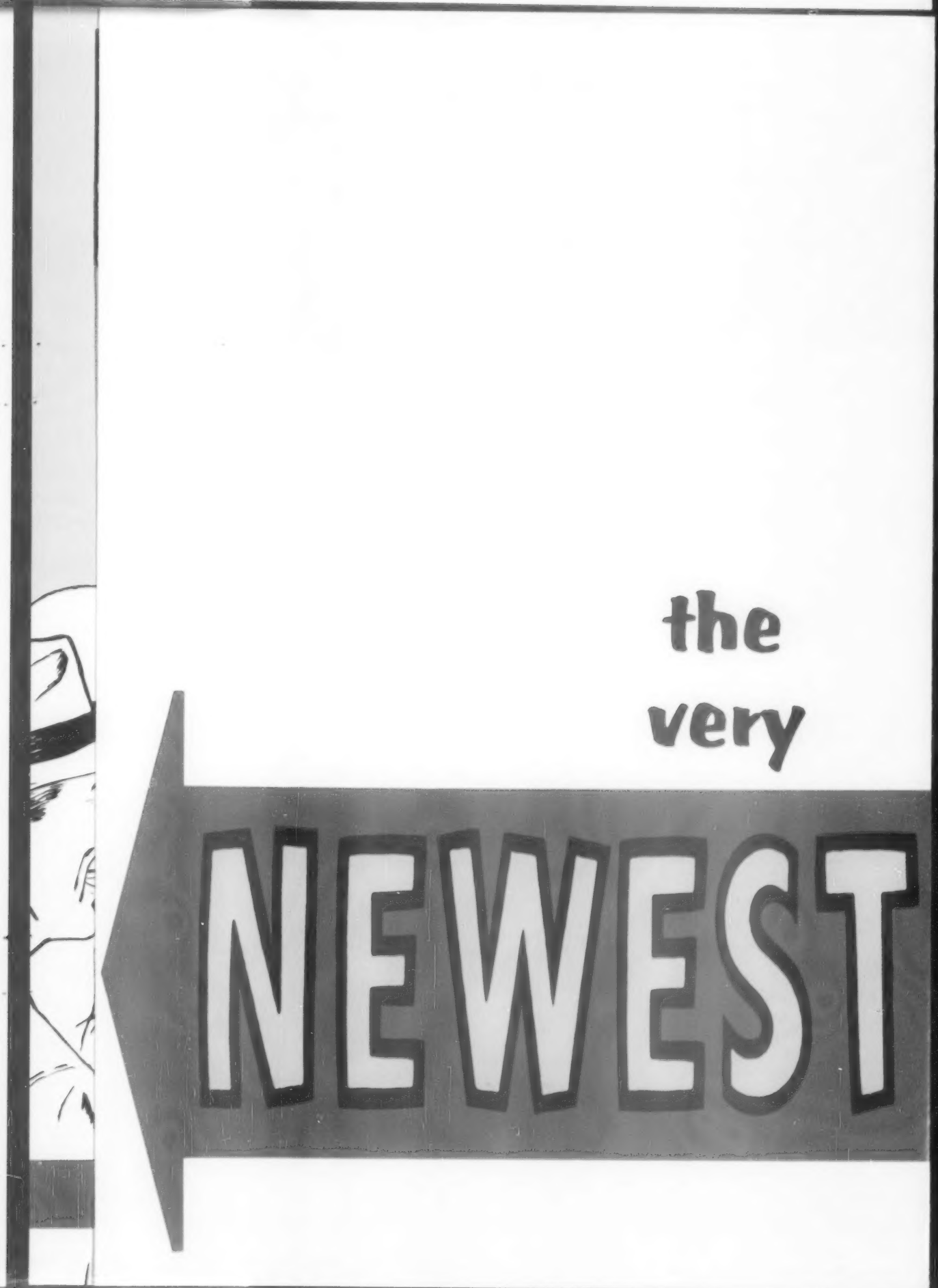
$$G = 610\ (M - 0.20) \qquad (1)$$

where

G = gal./M.M.c.f. stock-tank fluid in the separator

M = mole per cent n-pentane plus in the well stream

From this equation the quantity of separator stock-tank fluid may be easily predicted from the well-stream analysis as long as the separation temperature is below 20° F. Above 20° F. a more complex equation would be needed. Work is now under way in developing a more general correlation.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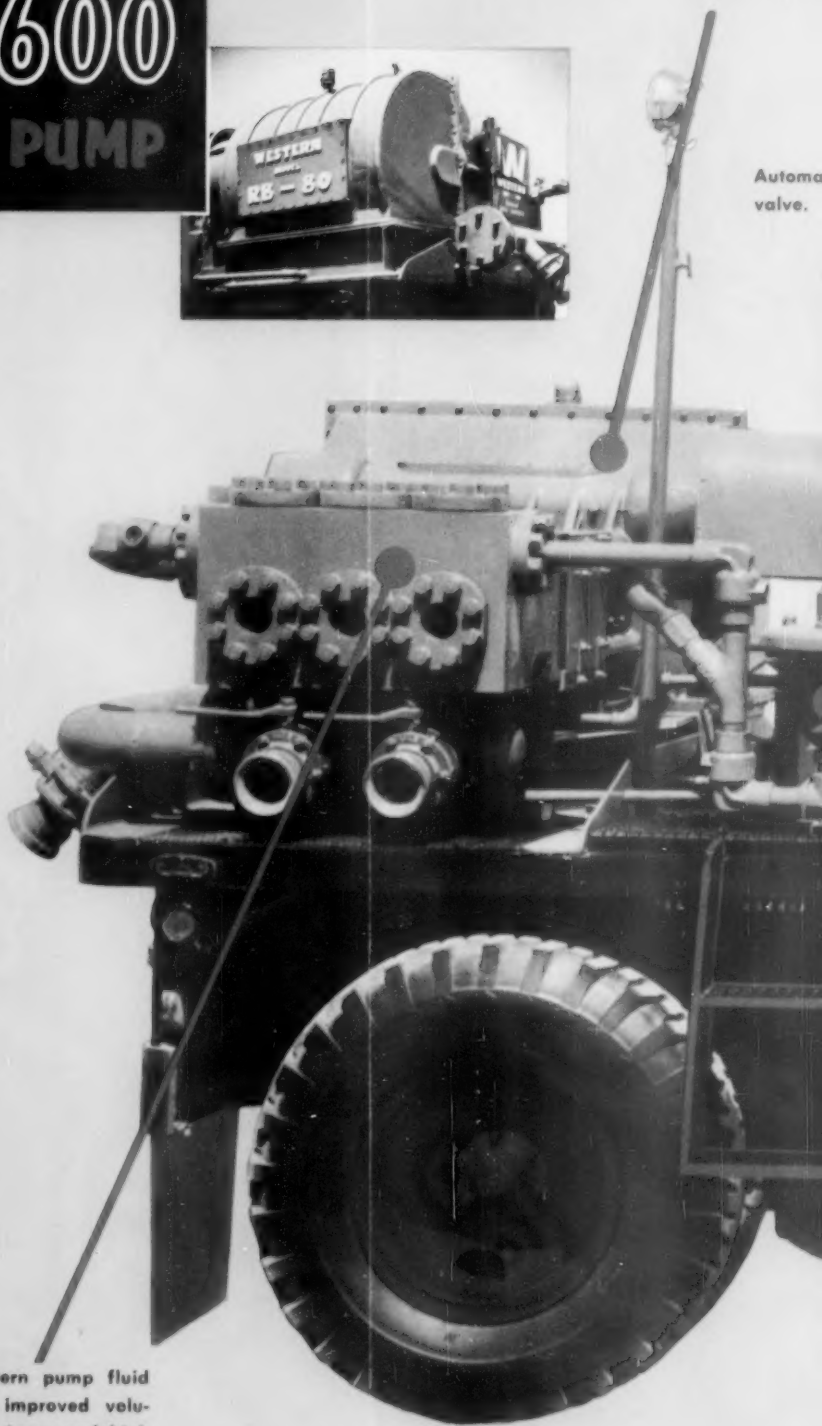

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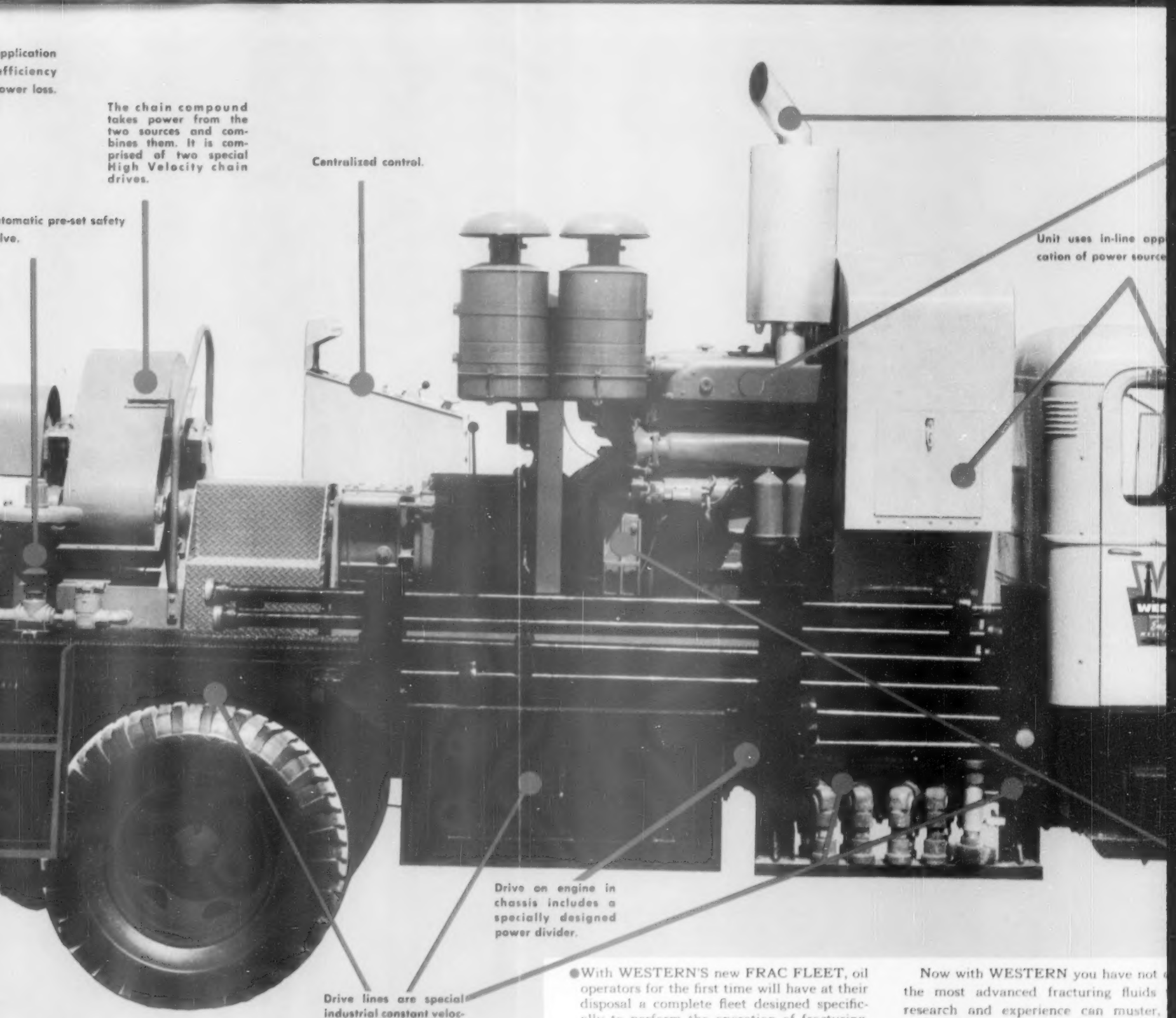
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fficiency
ower loss.
The chain compound takes power from the two sources and combines them. It is comprised of two special High Velocity chain drives.
Centralized control.
tomatic pre-set safety
lve.
Unit uses in-line app
cation of power source
Drive on engine in chassis includes a specially designed power divider.
Drive lines are special industrial constant velocity type U-joints. (High torque applications.)

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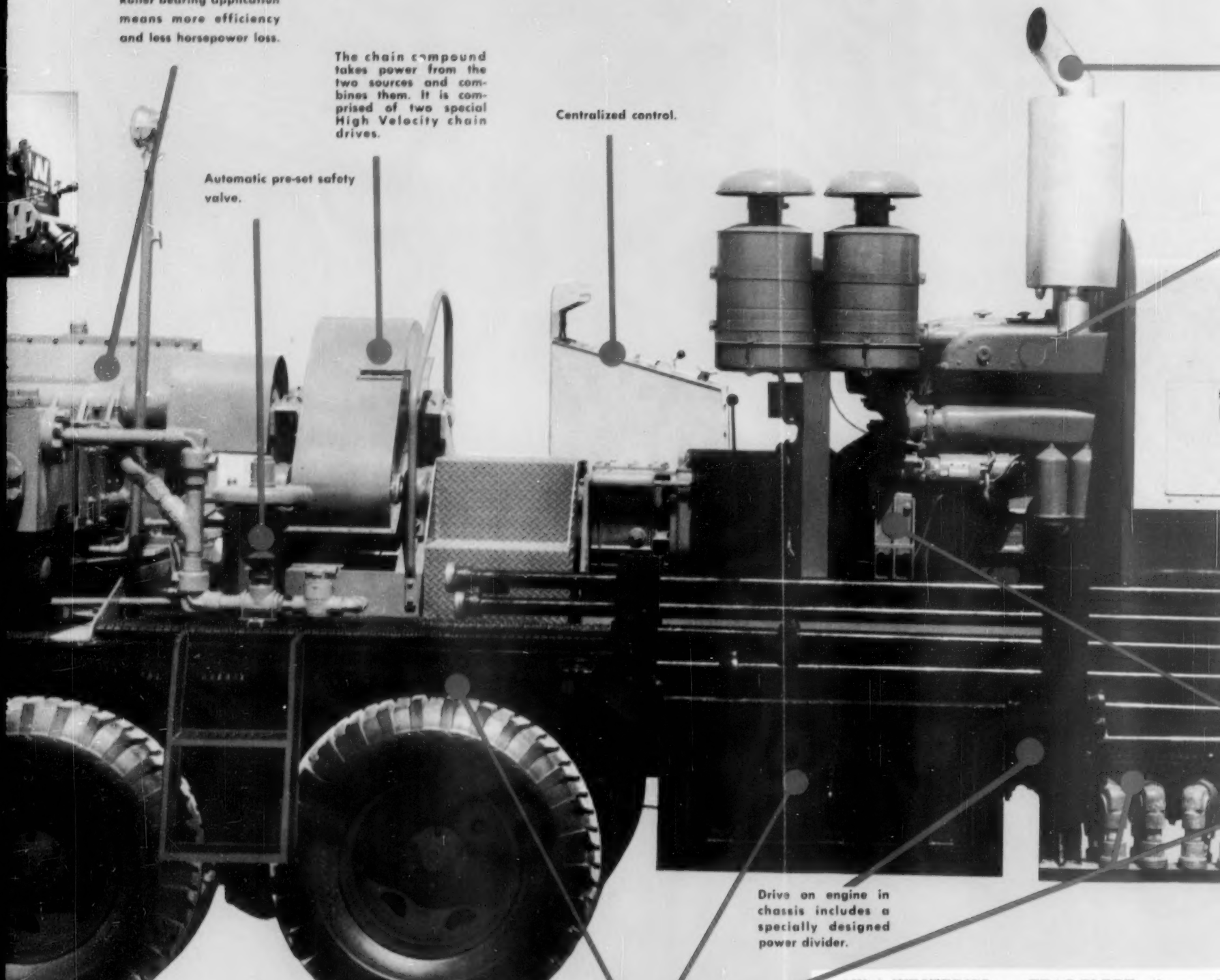
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The chain compound takes power from the two sources and combines them. It is comprised of two special High Velocity chain drives.
Centralized control.
Automatic pre-set safety valve.
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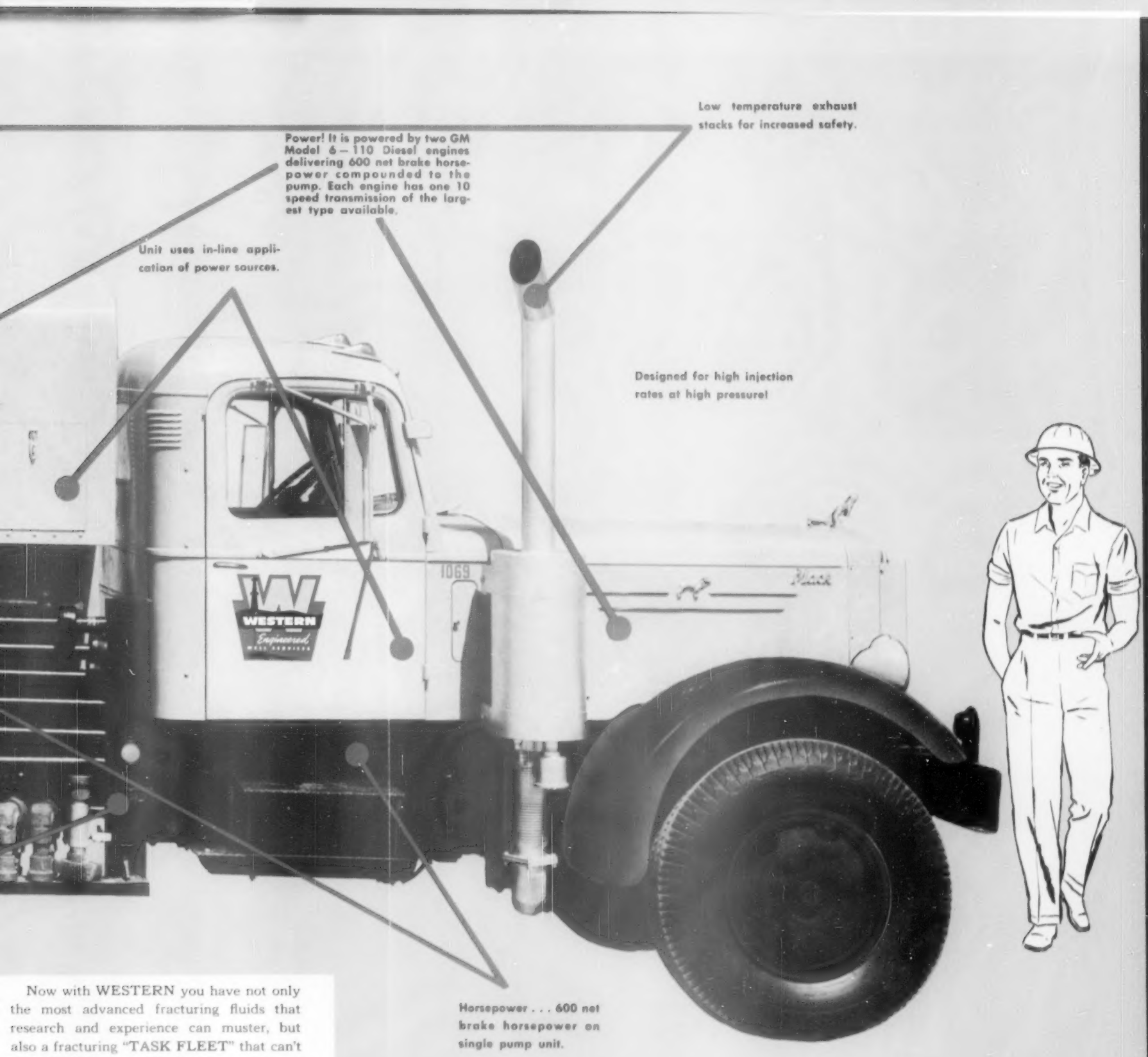
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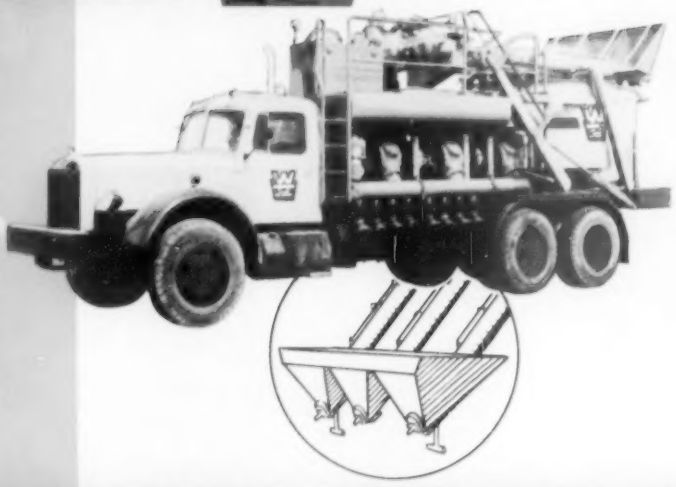
EXTRA FRACTURING EFFECTIVENESS

WESTERN'S MASTER-MIXER 40

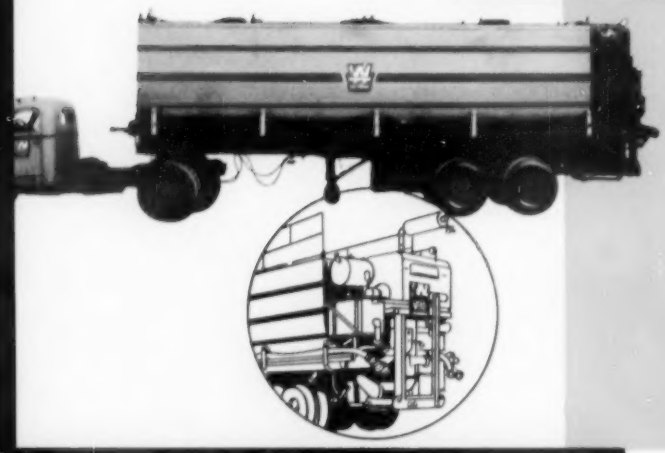
WESTERN'S new MASTER-MIXER 40 is the very first completely automatic mixer and is equipped with 20-barrel inventory tank. Three 9-inch screw-type elevators for lifting sand to operating level and three 750-GPM rate vane type pumps. Mixing is done by a hydraulically driven turbine type mixer.

Speed of screws is adjustable to speed of pumps by dial setting to give any sand-fluid ratio desired. This unit is designed to proportion sand to fluid automatically through manual setting in any ratio from ½ to 6 pounds per gallon at pumping rates variable from 5 to 40 BPM. Sand-fluid ratios may be changed at anytime during operation regardless of injection rate.

Also contains a slurry pump rated at 40 BPM of sand-laden fluid. The slurry pump is the supercharger to pressure flood the suction to pump units.



WESTERN'S TANK-MIXER 10,000



This is the first fully mobile trailer-mounted mixer ever designed for batch mixing of fracturing fluids in such large quantities in the field. The WESTERN TANK-MIXER has 10,500 gallon capacity and contains a hydraulically driven agitator shaft. Speeds of shaft containing 19 propellers can be varied with great flexibility from 0-60 RPM. The advantage of speed variation is that the degree of agitation can be adjusted to type of fluid — varied either before or during treatment.

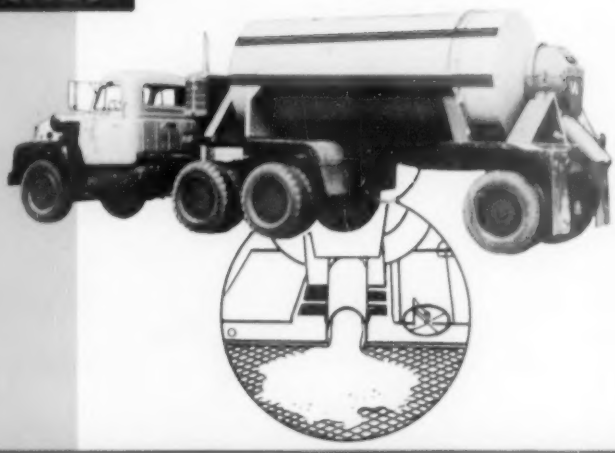
The unit also contains a slurry pump with a capacity up to 36 BPM to super charge the treating pumps operated from either side of TANK-MIXER.

WESTERN'S TRANSPORTER

This new WESTERN TRANSPORTER has 25,000 lbs. of sand carrying capacity and a maximum emptying capacity up to 5,000 pounds per minute. It is emptied by an internal screw flight arrangement which moves sand to point of discharge as drum is rotated.

This unit is also designed so that dry additives may be mixed with sand in drum. Rotational direction can be reversed for thorough mixing.

WESTERN'S TRANSPORTER can be operated from ground level, from one fixed location.



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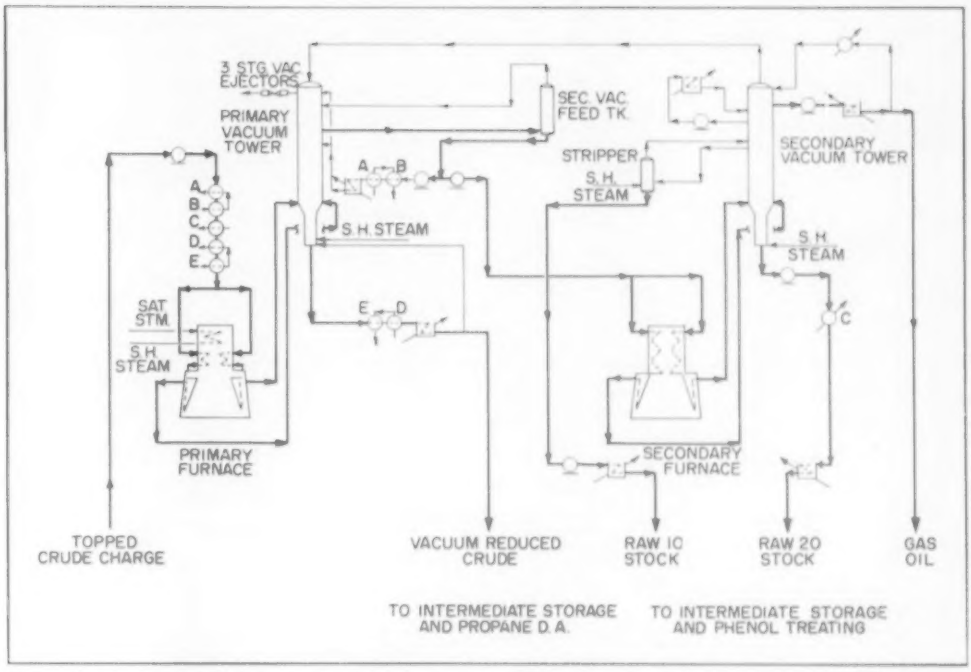


TWO-STAGE VACUUM UNIT . . . Gives narrow-boiling distillate cuts with minimum thermal degradation. Fig. 1.

Here are some timely operating tips on

Solvent Extraction of Lube Oils

by John C. Reidel
Journal Staff

A GOOD example of efficient operation in solvent extraction of lube oils is provided by Phillips Petroleum Co. at its Kansas City refinery.

. . . **Raw v.i. selection.** Crudes are carefully selected to obtain desired raw v.i. range as well as other desirable lube characteristics.

. . . **Two-stage vacuum unit.** This permits feed preparation at temperatures well below those employed in the more conventional one-stage operation.

. . . **Two-stage propane deasphalting.** The function of this unit is to separate vacuum reduced crude into two relatively narrow-boiling bright-stock fractions.

. . . **A 90-ft. phenol tower.** Additional contact stages are provided as compared with the conventional shorter tower.

. . . **Conductivity probes.** Improved operation of the phenol treating tower is achieved by careful control of the interface level. This is aided by a continuous record of tower conductivity gradient provided by conductivity probes.

. . . **High heat economy.** Careful arrangement of heat-exchanger trains in the phenol solvent-recovery section helps to achieve high heat economy.

. . . **Laboratory engine tests.** Plant operation is closely tied to engine tests, rather than physical laboratory tests. Particular emphasis is on detergent additive response and cold engine sludge tests. Day-to-day checks on the laboratory engines assure uniform and optimum extraction in the plant.

Processing

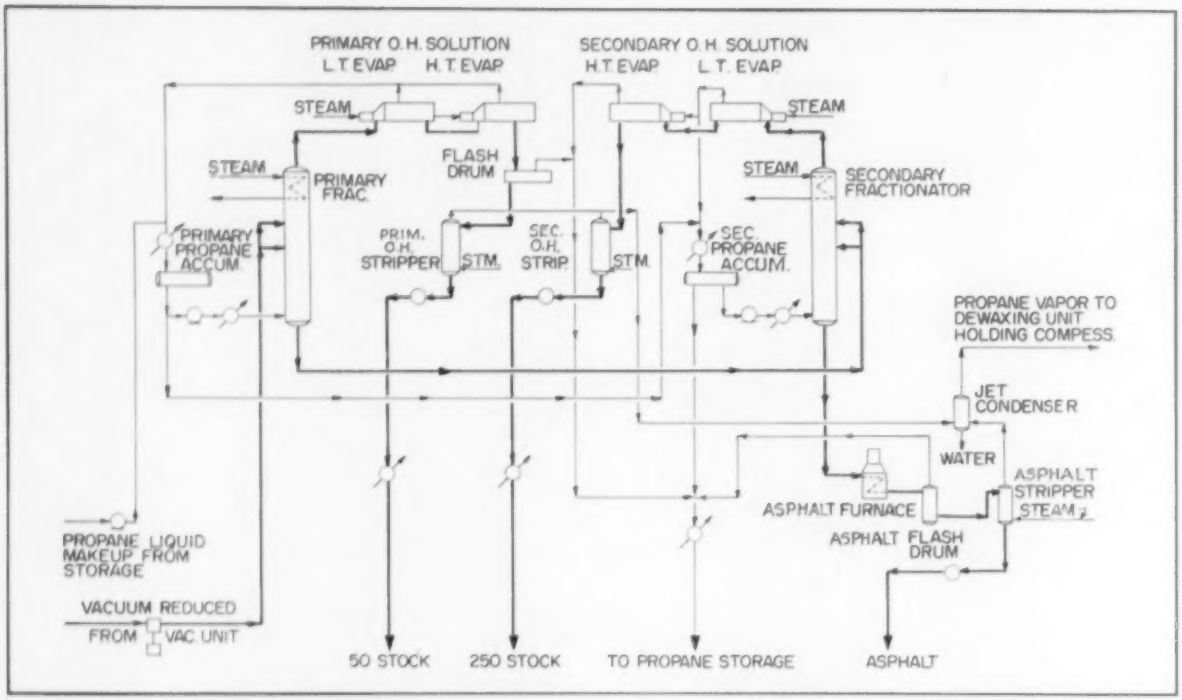
The lube-plant capacity, originally 1,500 bbl. per day, has since been increased to 2,000 bbl. daily. Main process steps are in the usual pattern involving vacuum distillation, propane deasphalting of residuals, phenol solvent extraction, and propane dewaxing. It has been found unnecessary to employ clay treating, the clay contact unit being on a standby basis. Vacuum distillation and propane deasphalting (Figs. 1 and 2) produce four raw distillate and residual fractions which end up as the following finished blend stocks:

Blend stocks—	Viscosity
Light (10 stock, neutral)	100 S.U.s. at 100° F.
Medium (20 stock, neutral)	325 S.U.s. at 100° F.
Medium heavy (50 stock, light bright stock)	110-120 S.U.s. at 210° F.
Heavy (250 stock, superheat bright stock)	200-210 S.U.s. at 210° F.

The superheat bright stock is particularly valuable as a blend in high-grade gear oils, and for minimizing upper cylinder and valve train wear. Either of the bright stocks in motor-oil blends aids in preventing intake-valve sticking.

Feed Preparation

A uniformly blended mixture of selected Oklahoma and West Texas lube-type crudes is processed for lube manufacture in one particular crude topping still. This unit was extensively redesigned with the lube operation in mind and is operated to avoid any possibility of cracking the lube type crude.



PROPANE D.A. . . . Two-stage unit is employed by Phillips Petroleum Co. at its Kansas City lube plant to carry through the principle of getting good separation between narrow-boiling cuts. Fig. 2.

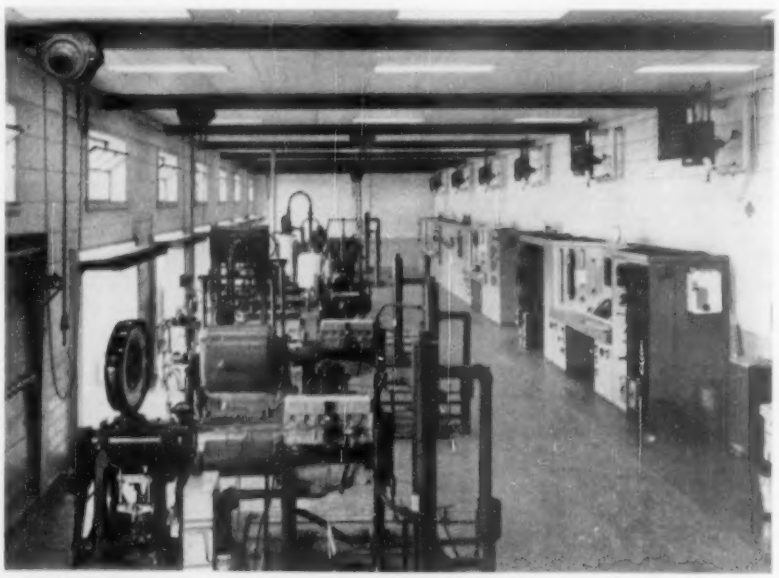
Specifically, Phillips prefers not to cut deeply in the topping operation, taking a longer topped crude which results in somewhat more gas oil taken off the secondary vacuum tower.

Two-stage vacuum unit . . . By employing two stages of vacuum distillation (Fig. 1) the requisite narrow-boiling distillate cuts can be obtained with minimum thermal degradation. Flash-zone temperatures are low, due to high vacuum at the top of the towers and to the use of fractionating trays specially designed for low pressure drop. Maximum transfer-line temperatures are ordinarily around 685° F. and never above 700° F. Note also provision of a recycle quench to the leg of the primary vacuum tower to further minimize possibility of cracking.

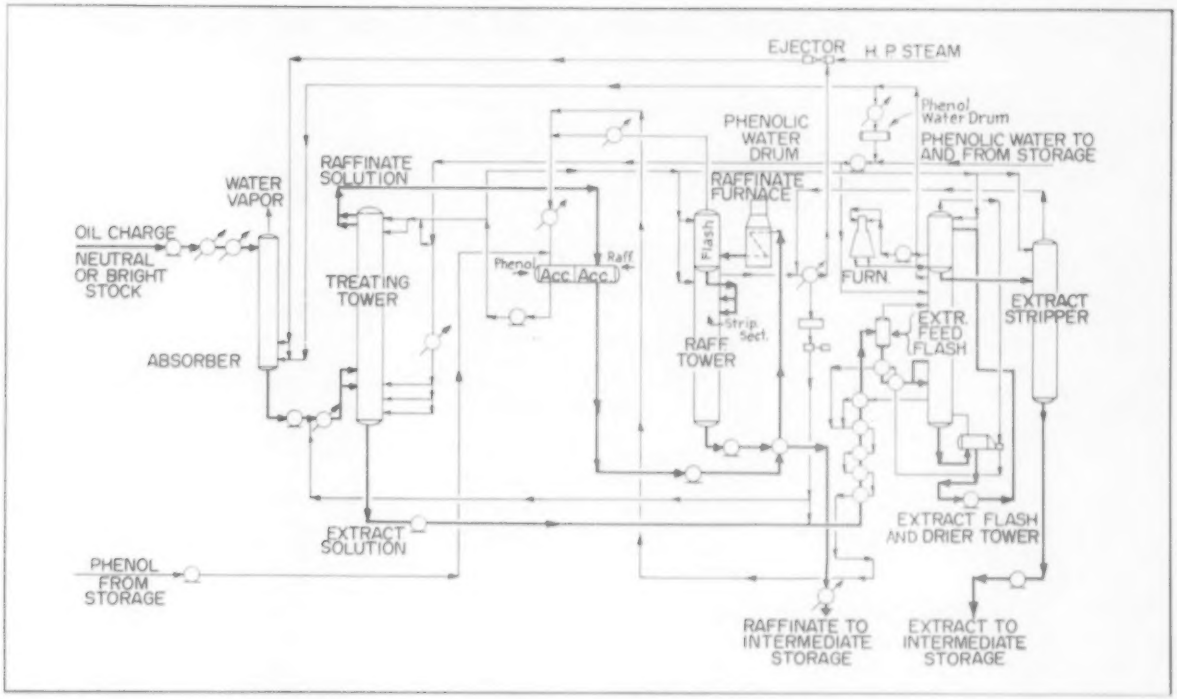
The primary vacuum tower is operated at total condensation. This tower makes the separation between vacuum reduced crude and neutral distillates, while the secondary vacuum tower fractionates the overhead cut from the primary vacuum tower into three components: gas oil, and raw 10 and 20 neutrals. A somewhat lower-boiling vacuum-reduced crude than usual results from this vacuum operation in which emphasis is on minimum exposure to temperature of the raw lube cuts.

Cold fractionation . . . The principle of getting good separation between comparatively narrow-boiling cuts is carried through in the propane deasphalting step by employing two stages to separate 50 and 250 raw bright stocks (Fig. 2). Fresh propane is fed near the bottom of the propane deasphalting columns. Vacuum-reduced crude enters at an intermediate point of the primary propane fractionator. To promote good contact serrated rectangular channels are staggered in the lower section; expanded-metal grating is installed as baffling in the upper section of each column.

In the lower part of the column liquid propane flows upward as the dispersed phase through a descending continuous oil phase consisting of the tarry or asphaltic material (reject oil) and propane. A solvent-rich phase, consisting of the lighter, less-resinous material dissolved in a large amount of pro-



ENGINE TESTS . . . Phillips ties the operation of its Kansas City lube plant closely to engine tests. This is the main dynamometer-engine room of the automotive laboratory at Bartlesville, Okla.



PHENOL SOLVENT EXTRACTION . . . A 90-ft. phenol tower is used. This is equipped with 24 trays. Extra contact trays permit a higher V.I. to be obtained at given solvent ratio. Fig. 3.

pane, is the continuous phase in the upper part of the column. The dispersed phase in this section is the rejected resins and asphaltic material.

Propane is sometimes termed a precipitative solvent as contrasted with phenol which is an extractive solvent. Propane rejects complex high-molecular-weight aromatics with many condensation rings (asphaltics and resins in residual stocks). Paraffins, waxes, and naphthenes are soluble in propane as are also noncomplex lower-molecular-weight aromatics. In effect, propane deasphalting is a mild solvent extraction with selective separation taking place according to molecular weight.

Propane fractionation of heavy oils differs from most solvent extraction processes in that the solvent dissolves the relatively large proportion of desired component (lubes), while rejecting the undesired (resin and asphaltic) phase. Most solvents are selected to dissolve preferentially the small percentage of undesired components.

As the temperature at which oil and propane are contacted is increased, the propane dissolves less of the oil, particularly the heavier resins and asphaltic materials. By varying the temperature, separation according to viscosity can be obtained. This separation has been described as being similar but in reverse to that occurring in distillation.[1] Change in propane-to-oil ratio also affects the separation. Selectivity for the lighter hydrocarbons increases as propane concentration is increased. More on propane and phenol as solvents may be found elsewhere in the literature.[2 3 4 5]

Propane D.A. control . . . From all this the fact emerges that the principal variables involved in operation of the propane fractionators are: (1) control of top temperature, and (2) selection of proper propane-to-oil ratio.

Visualize the propane fractionator as a conventional fractionating column turned upside down, with heat furnished through steam coils at the top of the column. Then the temperature held at the top determines the viscosity of the oil taken off overhead, with the temperature spread between top and bottom affecting the separation. From what has been briefly stated as to the propane-oil solubility relationship, it is evident that if top temperature is increased more oil will be rejected from propane. This results in greater internal reflux and sharper separation. The propane also becomes more selective for the lighter hydrocarbons at higher temperature. Lighter material will therefore go overhead at higher temperature.

In practice control of top temperature is obtained by temperature controllers which operate the control valves in the inlet lines to the steam coils. Propane entering near the bottom of the tower is cooled by water coolers with a temperature-recording controller operating a control valve in the bypass around the cooler. Of course, the temperature of the oil charge to the propane fractionator is a factor.

As to limitations on operating conditions, it is immediately apparent that the propane column must be at a pressure at least sufficient to keep propane in the liquid state. It must also be remembered that the critical temperature of propane is 206° F. Propane fractionation may be carried out at temperatures up to the critical or higher, and the propane-to-oil ratios varying from 5 to 1 up to 10 to 1 or higher.

In a typical Phillips operation, assuming a propane-to-oil ratio of 6 to 1 as charged to the column, the solvent-rich phase overhead might have a ratio of 11 to 1, although this could go as high as 20 to 1. The raw 50 stock is obtained after propane has been recovered from this overhead. The bottoms material might contain one part of propane to each part by volume of rejected oil. This primary reject oil is fed to the secondary propane fractionator. Here an additional counter current propane treatment makes the separation between raw 250 stock and an asphalt flux. This latter material is a good asphalt-blending material, imparting good ductility to premium commercial asphalt.

In the typical operation under consideration the primary tower might operate at say 190° F. top temperature

and at a pressure of about 650 psi. The corresponding conditions for the secondary tower might be 160° F. and in the neighborhood of 450 psi. This again is in reverse to a two-stage distillation process. Operating the secondary fractionator at a lower temperature changes the propane-oil solubility so that heavier material of a higher viscosity is taken overhead.

Originally a high interface level was carried in the Phillips operation to get away from possible third-phase coking and carbon deposition. Experience showed, however, that a low interface level could be carried with resulting smoother operation.

Phenol Treating

The Kellogg phenol solvent extraction has been described previously.[6] A brief process description of the Phillips operation (Fig. 3) follows.

The oil charge is heated to about 230° F. and passes through the phenol absorber. Here it absorbs the phenol from the vented steam which came into the system originally as stripping steam. The charge stock then enters the phenol treating tower.

Extra contact trays . . . The phenol tower was converted to its present use from other service. It is 10 ft. in diameter by 92 ft. 6 in. over-all height as compared with the conventional tower of perhaps 70-ft. height, and is equipped with 24 trays. A higher v.i. can be obtained with a given solvent ratio in this tower due to the extra contact trays.

These trays are of standard Kellogg design, with Raschig ring baskets in the upper section and distributing channels in the lower section, both devices being staggered to promote crossflow and redistribution of the dispersed phase in each section of the column.

Phenolic water is added at the bottom of this treating tower. Addition of the phenolic water at this point improves efficiency of separation in a manner analogous to reflux and increases the raffinate yield.

Phenol-to-oil ratios in the Phillips operation run from 1.5 to about 2.5. Phenol is introduced at the top of the tower. Phenolic water may also be added at this point. This forms the dispersed phase above the interface, the phenol droplets moving down in free settling between trays. The continuous phase flowing upward in this section is the oil-rich phase consisting of some phenol dissolved in the raffinate oil. Below the interface, the undissolved oil rises freely as the dispersed phase; the continuous phase is a phenol-rich phase consisting of the extract oil dissolved in phenol. More or less hindered settling takes place in the interface. One of the problems in tower operation in some plants is the tendency toward emulsification in the interface band.

Solvent recovery . . . The raffinate solution is preheated by heat exchange, heated further in the raffinate furnace and flashed to remove the major portion of the phenol. The remaining phenol in the oil from the bottom of the flash section is stripped with steam in the raffinate stripper section.

Heat economy . . . The extract solution, high in phenol content, goes through a heat-exchanger train where part of the phenol and water is vaporized and this is flashed in the drier feed flash drum. The vapors from this drum enter near the top of the extract drier tower. The liquid is further preheated in a second bank of heat exchangers before entering lower down in the drier tower. By interposing the drier feed flash drum between the two banks of heat exchangers more efficient heat exchange and tower loading is realized.

Phenol vapor is removed from near the bottom of the drier column and can be used as a partial control of the drier operation. Removal of phenol vapor at this point reduces the load on the extract and flash system. The drier overhead temperature is controlled by reflux. Drier tower feed temperature is controlled through a bypass around the exchangers. The overhead vapor from the extract drier is the phenol-water azeotrope. Most of this constant-boiling mixture is condensed, and is returned as reflux or is added as rejection water at the bottom of the phenol treating tower.

The phenolic water vapor resulting from steam stripping in the raffinate and extract strippers is vacuum condensed, and may be added to the extract solution before this goes to the extract drier. Uncondensed phenolic water vapor from the vacuum condenser and from the drier tower overhead go to the phenol absorber, where the phenol is absorbed by the charge oil, and excess water vapor is vented from the system. Phenol loss is held by Phillips normally down to 0.02 per cent on solvent circulation.

Conductivity probes . . . Phillips personnel have found that considerable improvement in phenol-tower operation can be obtained through close control of the interface level. This is aided by a record obtained by eight conductivity probes placed in the tower. These probes are placed as follows:

Probe	Location
1	Below bottom tray
2	Between trays 1 and 2
3	Between trays 4 and 5
4	Between trays 6 and 7
5	Between trays 8 and 9
6	Between trays 9 and 10
7	Between trays 11 and 12
8	Between trays 19 and 20

A continuous record is thus obtained of the conductivity gradient through the phenol tower and of the interface level. This is based on the principal that the continuous extract phase indicates a low resistance while the continuous raffinate phase shows a higher resistance, with a definite break between the two to indicate the interface.

Engine tests . . . The higher the extract yield obtained in refining, the cleaner the lube oil will be. However, deep extraction may also remove some of the natural inhibitors, leading to increased corrosion. Therefore a balance must be struck between engine cleanliness and bearing corrosion as indicated by laboratory engine tests. A fully equipped automotive laboratory is operated by the research division. This laboratory is approved by the Ordnance Reviewing Committee for engine testing of motor oils for qualification under military specifications. In addition to the standard Chevrolet and Caterpillar engine testing, promising motor-oil formulas are evaluated for valve-train wear, octane-requirement increase, cold-engine sludging, spark-plug fouling, and other engine tests.

Acknowledgment

Appreciation is expressed to R. W. Henry and Darrel Hughes, Phillips Petroleum Co. lube-oil section at Bartlesville, for their aid in preparation of this article. V. C. Cavin is superintendent of the Kansas City refinery. J. L. King is lube superintendent. T. D. Pickell is lube manufacturing division supervisor and N. G. Miller is process engineer for the lube plant.

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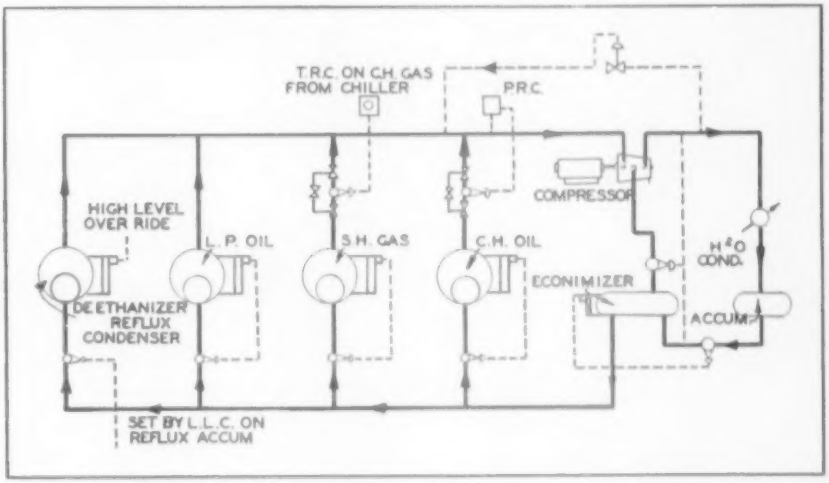
Problems of one kind or another crop up almost daily in cycling plants. Here are some that were encountered—and solved—at Magnolia's Seeligson cycling plant in Jim Wells County, Texas. In this last of three articles on this plant, you'll see how Magnolia's engineers succeed in . . .



COMBINING a pressure controller and a bypass increased cooling of the deethanizer chillers. Fig. 1.

Getting More Out of Processing Equipment

by F. Lawrence Resen
Gulf Coast District Editor

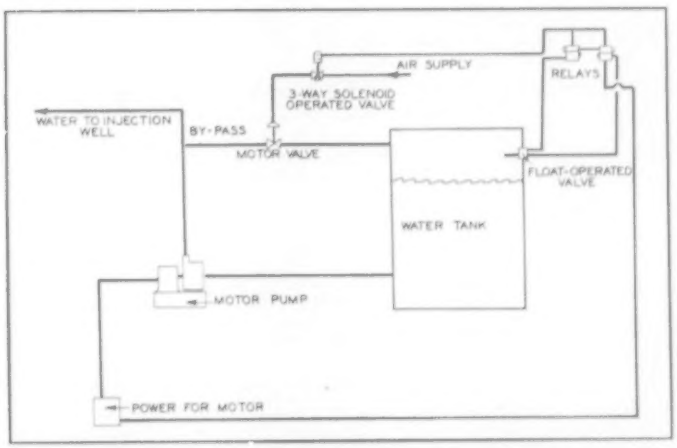
Butane cooling . . . In the refrigeration system at the plant, butane is circulated over four chillers arranged in parallel (Fig. 1). They are—in order of their distance from the compressor—the casing-head oil chiller, the casing-head gas chiller, the low-pressure oil chiller, and the deethanizer reflux condenser.

In the operation of this system, the flow through the low-pressure oil chiller remains practically constant, as does the flow through the deethanizer reflux condenser. Most variation in flow and refrigeration load will come through the chillers used for casing-head gas and oil flow.

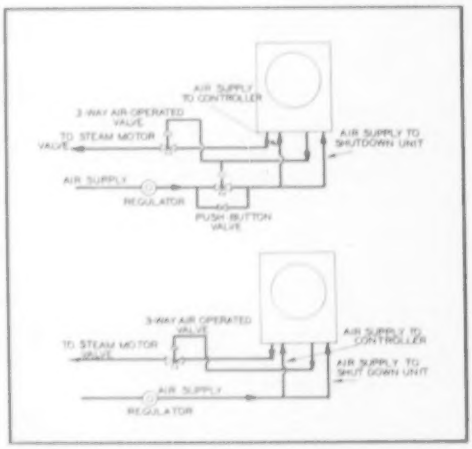
A temperature recorder controller is used on the casing-head gas from the chiller to eliminate hydrate problems. Thus the main place for variation is the casing-head oil chiller. Also, this particular chiller requires about half the refrigeration capacity. For these reasons, the casing-head oil chiller became the focal point for a control system on the refrigeration unit.

Under previous conditions, where the output of the refrigeration system was

The first two installments of this series were published in the On the Job section of the February 21, 1955, and May 2, 1955, issues respectively. Additional information on the Seeligson plant was published in a May 1950 issue in an article, "Seeligson Field Pressure-Maintenance and Hydrocarbon-Recovery Plant."



BYPASSING the injection well temporarily allowed the pump motor to get up to speed before actually discharging into the well. This reduced the starting load on the motor by not requiring it to buck the high head of well in starting. Fig. 2.



CUTOFF CONTROLS protect both high and low-pressure stills. On the high-pressure system, a pushbutton valve was added to reestablish air supply to the controller and so guard against sudden surges. Fig. 3.

FORMATION WATER CONTROLLED

SOS (Slurry Oil Squeeze)—new DOWELL service for oil and gas wells—stopped water production completely, aided effectiveness of fracturing

Dowell's new Cementing Service—SOS (Slurry Oil Squeeze)*—is designed to provide a fast, low-cost means of ending troublesome water encroachment in oil and gas wells.

Production records have proved the effectiveness of SOS. For instance, one oil well completed in a sandstone formation was producing 200 barrels of salt water and only 3 barrels of oil per day. SOS by Dowell stopped the water completely and paved the way for a small gallonage Sandfrac† treatment. After the fracturing treatment, the well pumped 75 BOPD with no water.

Dowell engineers premix the entire batch of slurry for SOS in truck-mounted, paddle-mixing tanks. This equipment is specially designed to mix a uniform slurry—even in small batches. High-pressure triplex pumps are used to inject the slurry into the formation. The SOS slurry is made up of portland cement, a Dowell surface tension reducing agent and a non-aqueous carrying medium—for example, specially blended oils. The cement sets up only when contacted by formation water.

Contact the nearest Dowell office for more information on SOS or any of Dowell's many oil field services—in Venezuela, contact United Oilwell Service, S.A. Or write Dowell Incorporated, Tulsa 1, Oklahoma, Dept. E-11.

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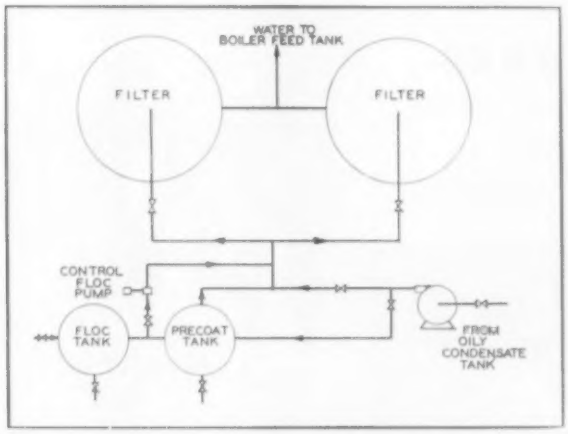
ON THE JOB . . . . . IN THE PLANTS



TWO charcoal filter units are operated in parallel in this oily condensate filter unit. Steam is injected into the top of the bed by Palmer sprayers just prior to backwashing. Fig. 4.

THE CONDENSATE UNIT, grouped as in the above photo, uses injected steam to loosen the hydroxide layer enough so that it can be dislodged from the charcoal bed by the incoming backwash water.

varied by changing the speed of the compressor, the deethanizer lean-oil chillers sometimes would not get enough cooling. This would be true at refrigeration rates below maximum, when the casing-head oil cooler would divert more than its required amount of coolant through its coils. If the compressor speed were increased to compensate for this, then too much coolant might be applied through the other coolers. Likewise, use of a temperature recorder controller on the system was not practical due to the varying requirements.

The problem was solved by controlling the vapor drawoff on the casing-head oil chiller and setting the speed of the compressor at a constant rate so that it would always be operating at maximum refrigeration output. A pressure recording controller was installed on the vapor drawoff line. There it acted to draw off or back up the vapor on the casing-head oil cooler, thereby maintaining a relatively constant amount of refrigeration on the other chillers and letting the oil chiller take a swing in load to maintain a constant suction pressure to the compressor. A bypass was installed running from the compressor discharge to the suction line of the compressor, upstream of the vapor drawoff line from the casing-head oil chiller. A pressure control on this bypass line operates to prevent the compressor from pulling the suction too low when the refrigeration load drops.

Pump unloading . . . The waste-water-disposal system at the plant includes an underground water-disposal well. The water is subjected to chemical treatment, is filtered, and then enters a surge tank from which a 150-hp. injection pump takes suction.

Under earlier conditions, the starting load on the pump was high since it was starting up against the high head of the injection well. A control arrangement was installed which provided for a temporary bypass back into the surge tank. This permitted the pump motor to get up to speed before actually discharging into the well (Fig. 2).

As a float rises in the surge tank, it actuates a time-delay switch. This serves to throw a current across a solenoid controlling air supply to the motor valve on the bypass line from the pump discharge to the tank. With the solenoid energized, the air reaches the bypass valve and causes it to open.

A relay, set to operate 10 seconds after the time-delay switch is actuated, next comes into play to energize the pump motor which starts and comes up to speed. A second relay cuts in after another 10 seconds. This serves to deenergize the solenoid valve, cutting off air to the motor supply and also bleeding air off the motor valve line. Thus, the bypass is closed and the pump then discharges into the injection well.

Note that avoiding high starting load is equally important with regard to cost of purchased power. Since costs are determined according to the peak plant load at any instant, momentary overloading of the pump motor would contribute to higher power costs.

Steam cutoff . . . Steam lines entering the low-pressure and high-pressure stills are equipped with cutoff controls to protect the steam system from possible backup of oil should the steam pressure drop.

A high-sensitivity unit operates to bleed oil from a three-way valve. This in turn cuts off the air supply to the steam motor valve and causes it to close off the steam line (Fig. 3). In the low-pressure operation, as the steam pressure builds up again, the air supply to the three-way control valve will be automatically cut in once the pressure control point has been reached.

However, on the high-pressure system, a push-button valve is used to reestablish air supply to the controller. This added precaution has been taken to guard against sudden surges which would be difficult to control at high pressures.

The high sensitivity of the control units and the instrumentation provide a fast-acting system which can cut off any back flow of oil which might otherwise take place with hand-operated valves.

Condensate filters . . . A modification in the backwash procedure on the oily condensate filters has minimized loss of the filter-bed charcoal.

The oil condensate filter unit consists of two charcoal filter drums operated in parallel, a tank for supplying the filtrate on a continuous basis, and a precoat tank (Fig. 4). An aluminum hydroxide floc is prepared by reacting alum and soda ash, and this geleatinous material acts as the filtering medium.

When initially precoating a filter after backwashing, the reactants are first mixed in the floc tank and allowed to react for an hour before being used. The hydroxide floc then flows by gravity into the precoat tank, which holds enough floc to precoat one filter. The oil condensate stream is then turned

"Varec" FIG. NO. 2500 SERIES

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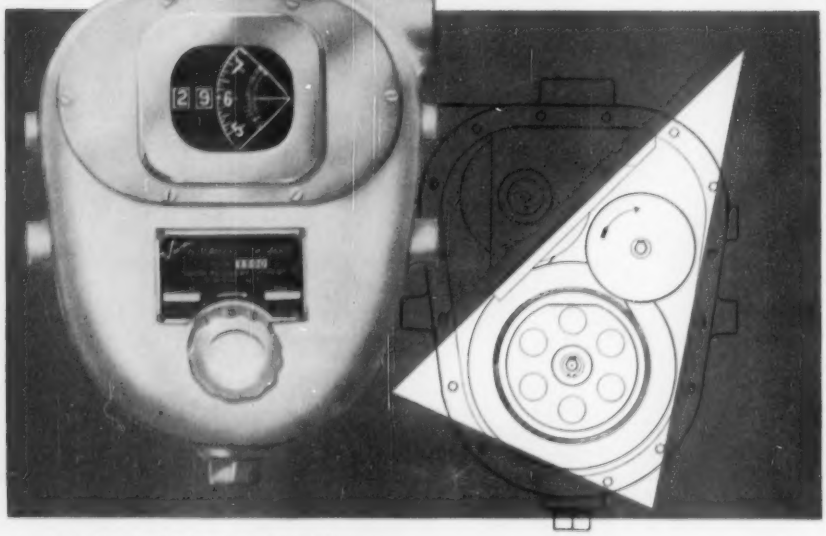

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The VAREC Figure No. 2500 Series Gauges have been developed, over a period of several years, in response to urgent field requests for a dependable automatic tank gauge which would eliminate difficulties universally encountered with tape reading, counterweight type gauges. The instrument now offered represents the results of sincere effort on the part of VAREC engineers, invaluable and deeply appreciated customer-cooperation, and experience gained from over 2000 installations covering practically every conceivable field operating condition.

Successfully incorporated in this gauge are such features as (1) liquid level indication on a mechanical counter arrangement for ease of reading, (2) operation checker, (3) gravity compensator, (4) simple calibration and gravity compensator adjustment from outside the gaugehead. Never necessary to gain access to tape, loosen support brackets or make adjustments in the presence of dangerous tank vapors, (5) provision for convenient addition, at any time, of auxiliary equipment such as mechanical limit or control switches, programmers, VAREC Remote Reading Gauger Transmitters, etc., (6) corrosion resistant materials of construction, as typified by the use of specially made Type 316 stainless steel ball bearings, and (7) all metal construction of components which insures electrical ground to tank shell.

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into the precoat tank and carries the floc into the filter after being precoated. Although the filters are operated in parallel, they are precoated individually.

After the initial coat, floc is continuously injected into the condensate stream entering the filters. In this manner, oil content is reduced from about 20 to 25 p.p.m. to less than 1 p.p.m., and then filtered condensate enters the boiler feed tank.

As the floc builds up on the charcoal filter, it tends to cut down on the effectiveness of the units. So backwashing and precoating is again resorted to. Due to the very nature of the hydroxide, the gelatinous mass adhers to the surface of the charcoal. And so, in previous backwashing, a significant amount of filter bed would be lost along with the washed-out floc.

A procedure was then developed so that a supply of steam would first be injected into the top of the bed by Palmer sprayers just prior to backwashing. This served to loosen sufficiently the hydroxide layer enough so that incoming backwash water would easily dislodge it from the charcoal bed. As a result, loss of charcoal medium has been cut to a minimum by this simple method.

One interesting aspect of the filters' operation was discovered when a tap was made into the dished heads of the filter drums. In this space a layer of distillate was discovered, indicating that in addition to absorbing oil in the condensate stream, the hydroxide was also separating it from the condensate and allowing it to be recovered.

Lube-oil reclamation . . . Cost of lubricating oils is an expected expense of operating a gas engine. In a plant such as Seeligson, where over 200 M.M.c.f.d. of gas may be handled, the gas engine-compressor capacity is such that these costs can run high.

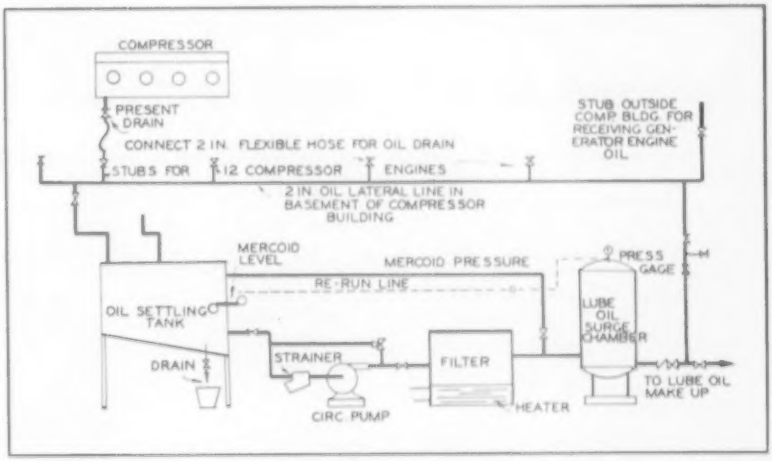
To eliminate some of these costs, a crankcase-oil reclaiming system was designed and is now being built (Fig. 5). Oil to be reclaimed will include that from 12 compressor engines and the generator engines.

A 2-in. lateral oil line installed in the basement of the compressor building will have stubs located conveniently beneath each engine. A 2-in. flexible hose will be used to connect the stub to the drain on each individual engine. Then when an oil change is necessary, or when an engine is overhauled the used oil may be drained into the lateral line and carried to the oil settling tank.

This settling tank contains a sloping bottom so that extra-heavy sediments may be withdrawn through a bottom drain. Meanwhile, a circulating pump will pick up the oil from the tank and charge it to fuller's-earth filter.

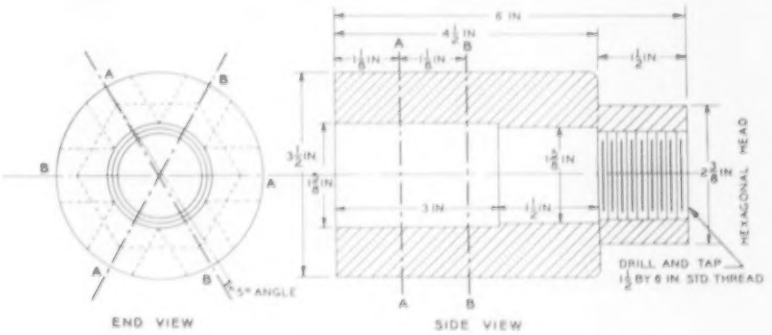
On its pass through the filter, the viscosity of the oil will be kept at a low level by means of a steam-heater coil in the lower section of the filter unit. A rerun line on the outlet of the filter unit will be placed so the oil may be recirculated back to the settling tank and through the filter as many times as necessary until its acidity is at a desired point.

On its final pass, the oil will leave the filter and enter a lube-oil surge chamber from where it will enter lube-oil makeup storage. The reclaimed oil may then be used in the lubricators or crankcase, as desired.



THE RECLAIMING SYSTEM above was designed specifically to reclaim crankcase oil from 12 compressor engines and the generator engines. Fig. 5.

Acknowledgments . . . We greatly appreciate both the cooperation of management of Magnolia Petroleum Co. in the publication of this material and the assistance rendered by personnel at the Seeligson plant, including: J. A. Upton, district superintendent; Lee E. Robinson, Jr., assistant superintendent; W. O. Medlin, senior plant engineer; and J. G. Townsend, plant supervisor.



Special tool pulls studs easier, safer

THE stud puller shown here, when used with a pneumatic reversible-impact wrench, will pull the most stubborn stud bolts with ease and safety. One man can remove the studs from a power cylinder in less than 1 hour. Cylinders have been destudded with this puller; no bolts were broken and all studs were usable again. Referring to the end view, three holes are drilled and tapped at levels A and B, respectively, to hold ⅞ by 1¼-in. socket-head cup-point set screws. Hole is offset about 5° from center of piece. Set screw holes are not shown in side view. Suggestion made by natural-gasoline department personnel of Phillips Petroleum Co.

by W. L. Nelson
Technical Editor

QUESTIONS ON TECHNOLOGY

Petroleum Coke in Steel Manufacture

"What are the opportunities to sell petroleum coke to the steel industry? Petroleum coke has a better heating value and ash content than coke produced from coal." S.K.F.

Although it is true that petroleum coke has a higher heating value and lower ash content that coal coke, it also usually contains too much sulfur *(see Questions on Technology, March 9, 1953, p. 125)* and it is not hard or strong enough to support the enormous loads encountered in blast furnaces. In 1952, about 10 per cent of the petroleum coke production was used by the steel industry but as a recarburizing agent rather than as a fuel. In this respect, P. J. Wilson (Petroleum Processing, March 1952), states that about 95 per cent of carbon in petroleum coke is absorbed by steel whereas only 25 per cent of the carbon in anthracite coal and only 15 per cent of that in coal coke is absorbed. These figures apply to materials of equal fixed carbon content.

Strong enough cokes for cupola operations (foundry melting of pig iron) have been produced by calcining to volatile matter percentages of about 2 per cent but sulfur is again the difficulty. The sulfur percentage of 0.5 called for in a metallurgical-grade coke cannot be attained unless the parent crude oil contains only 0.25 or less per cent of sulfur—and 0.25 per cent sulfur in the crude oil is frequently too much. The analyses of several types of petroleum coke are indicated in Table 1, and coal cokes in Table 2.

The coal-coke market is an attractive one—the byproduct and beehive production have been (thousands of short tons):

	Byproduct	Beehive
1936	44,569	1,706
1941	58,482	6,704
1949	60,222	3,415
1950	66,891	5,827
1951	71,783	7,340

The heating-value equivalent of the coal-coke consumption amounts to about 800,000 bbl. per day of cracked fuel oil. The actual petroleum coke production in 1950 was only 3,400,000 tons compared to the 72,718,000 tons of coal coke. Coke could provide an enormous new market for residual petroleum products if only some method of eliminating sulfur could be devised.

Prices of Fire Brick

"I have some old quotations on fire brick and other materials. Can your indexes be used to estimate prices now?"—G.F.P.N.

In converting old prices into current ones, a search should be made for cost indexes that apply to such a material, or at least to similar materials.

The changes in price of fire brick and of structural clay products have been about as follows:

	Relative to 1946	
	Fire brick	Structural clay
1926	68.2	.....
1944	84.3	.....
1945	88.2	.....
1946	100.0	100.0
1947	121.0	111.4
1948	133.8	121.3
1949	139.8	126.0
1950	153.4	134.6
1951	165.3	145.2
1952	167.1	145.8
1953	181.8	153.1
1954	193.1	159.1
Dec. 1954	199.0	161.8

The base price in 1946 was $57.29 per 1,000 brick to satisfy the above index numbers (the price in December 1954 was $114.00). Current indexes of price are published each quarter (January, April, July and October) on the Cost-imating page of The Oil and Gas Journal.

Indexes on similar materials are published by the Bureau of Labor Statistics in its "Wholesale Price Index:"

Code	
13-40	Structural clay products
13-41	Building brick
13-42	Fire-clay brick, 9 x 4½ x 2½ in.
13-43-01	Face brick, red, select, textured
13-43-11	Face brick, buff, select
13-44-01	Drain tile, round, 4 in.
13-44-11	Structural tile, facing, ceramic glazed, 4 x 5 x 12 in.
13-44-21	Partition tile, scored, 4 x 12 x 12 in., 3 cell, No. 16
13-44-31	Wall tile, 4¼ x 4¼ in., standard grade, glazed, white and colored
13-45-01	Vitrified clay sewer pipe, 8-in. diameter, 3-ft. length

TABLE 2—APPROXIMATE ANALYSES OF METALLURGICAL COAL COKES

	Connellsville		Alabama	West Virginia	Pocahontas	Byproduct
Volatile matter, per cent	1.35	1.08	2.75	1.12	1.20	1.85
Fixed carbon, per cent	88.05	87.22	83.15	88.60	92.30	87.07
Ash, per cent	10.60	11.70	14.10	10.28	6.50	11.08
Sulfur, per cent	0.74	0.86	1.20	0.69	0.60	0.75
Phosphorus, per cent	0.018	0.012	0.03	0.009	0.010	0.023

TABLE 1—APPROXIMATE REQUIREMENTS OF METALLURGICAL AND OTHER GRADES OF PETROLEUM COKE

		Aluminum industry electrode coke			Cupola cokes		
	Analysis of drum coke	1953†	1936	Metallurgical grade coke†	a	b	c	c
Volatile matter, per cent	8-18 or higher*	12 or lower	7	4.5-8	2.1	0.44	2.2	2.9
Fixed carbon, per cent	79-90	88	90	91-94.5	95.8	99.19	93.0	89.1
Sulfur, per cent	0.2-4.2 or higher	2 or less	1.5	0.5 or less	0.5	0.65	0.42	0.29
Ash, per cent	0.05-1.6 or more	1 or less	1.5	0.75 or less	1.5	0.37	4.6	7.1
Moisture, per cent	.....	.....	.....	.....	0.6	.....	0.2	0.9

*The volatile matter has been increasing since 1930, as more delayed coking operations charging reduced crude oil have been installed. †Petroleum Processing, March 1952, p. 351.

(a) C. B. Carpenter, Mechanical Engineering, 56, 330 (1934). (b) U. S. Patent 2,177,226. Note—sums to over 100 per cent. (c) A. R. Gray, Lab. Ensayo Materiales e Invest. Technologicas, Buenos Aires, (La Plata, Rep. Arg.) Ser. II, 17, 27 pp. (1947).

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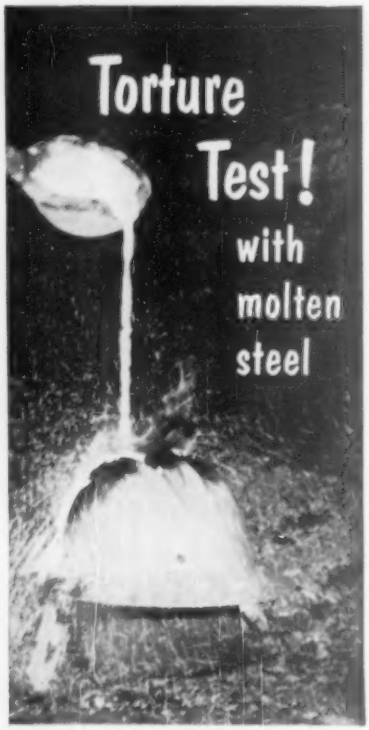

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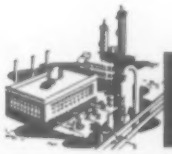

THE FOREMAN'S PAGE

Refining • Petrochem • Natural Gasoline

JOB IMPROVEMENT FOR THE PROCESS FOREMAN—6

Here's Why Charge Weight Must Equal Yield Weight

ONE of the basic laws of science states that neither matter nor energy can be created or destroyed in any ordinary reaction. This is an elaborate statement of a fact that everyone knows to be true and uses in everyday thinking. No one expects to get more or less cups of coffee from a Thermos bottle than were placed in the bottle. Neither do we expect to get more heat or less heat from a gas burner than is contained in the gas which is burned. This does not mean that the energy and materials of a reaction are always recoverable. But it does mean that all of the energy and all of the matter can be accounted for.

Fortunately, this law applies to all of the processes in the refinery. If we charge 100 lb. of crude oil to a bubble tower, exactly 100 lb. of various products can be removed from the tower—no more, no less. If we add 40,000 B.t.u.'s to this 100 lb. of crude in order to vaporize and fractionate it, then 40,000 B.t.u.'s must be removed from the products, with cooling water, if they are to be yielded as a liquid at the same temperature as the charge.

A tabulation of the weights of charge and yield streams on a unit is known as a weight balance. A similar tabulation for the heat charged to and yielded from a unit is known as a heat balance. Charge must always equal yield for steady operation. Otherwise, there must be an error in the measurements of weight or heat. Of course, there are always small errors in measuring heat and weight. But these errors can usually be reduced to a point where they do not affect the utility of these balances.

Actually, in the refinery we measure volumes and determine the gravity weight per unit volume rather than measuring weight directly. Charge and yield volumes do not necessarily have to be equal. On a crude still, where little or no cracking takes place, the barrels of crude charge may be equal to the barrels of products if the gas yields are converted back to liquid barrels. On a cracking still, we may crack 10 bbl. of charge into 11 or 12 bbl. of products, and on a polymerization unit, we may polymerize 10 bbl. of charge into 8 bbl. of products.

This idea that total yield weight must be equal to total charge weight is very useful in operations, engineering, and accounting. Some examples of volume and weight balances are shown in Tables 1, 2, and 3.

Of course, it is impractical for operating personnel to calculate detailed heat and material balances as a guide for operation. However, the basic idea of balance is a tool through which many otherwise difficult problems can be solved easily. Therefore, this idea should be kept in mind.

This material is taken from training program notes, Esso Standard Oil Co., Baton Rouge, La.; and from notes supplied by refining department, Phillips Petroleum Co., Bartlesville, Okla.

TABLE 1—CRUDE TOPPING

	Volume balance		Weight balance	
	Barrels per hour	Liquid vol. per cent	Pounds per hour	Weight per cent
Charge:				
Crude oil	548.3	100.0	159,200	100.0
Yield:				
Gas to gas plant	5.0	0.9	853	0.5
No. 3 tower gasoline	100.2	18.3	25,160	15.8
No. 2 tower gasoline	7.0	1.3	1,840	1.2
Reforming stock	24.8	4.5	6,670	4.2
Kerosine	60.1	11.0	17,000	10.7
No. 1 heating oil	58.1	10.6	16,620	10.4
No. 3 heating oil	31.2	5.7	9,200	5.7
Heavy gas oil	51.3	9.4	15,500	9.6
Cylinder stock	210.6	38.3	66,357	41.9
Total yields	548.3	100.0	159,200	100.0

TABLE 2—CATALYTIC CRACKING

	Volume balance		Weight balance	
	Barrels per hour	Liquid vol. per cent	Pounds per hour	Weight per cent
Charge:				
Fresh gas oil	857	100.0	262,930	100.0
Yield:				
Dry gas, ethane and lighter	43	5.0	4,510	1.7
Propanes and butanes	89	10.4	17,820	6.8
Light gasoline	239	33.7	73,860	28.0
Heavy gasoline	74	8.6	21,500	8.2
Light cycle oil	362	42.2	110,500	42.0
Slurry yield	40	4.7	13,840	5.3
Coke			20,900	8.0
Total yields	897	104.6	262,930	100.0

TABLE 3—CATALYTIC POLYMERIZATION

	Volume balance		Weight balance	
	Barrels per hour	Liquid vol. per cent	Pounds per hour	Weight per cent
Charge:				
Propanes and butanes	78	100.0	15,500	100.0
Yield:				
Propane and lighter	32	41.0	5,680	36.7
Butane	10	12.8	2,080	13.4
Polymer	30	38.5	7,740	49.9
Total yields	72	92.3	15,500	100.0

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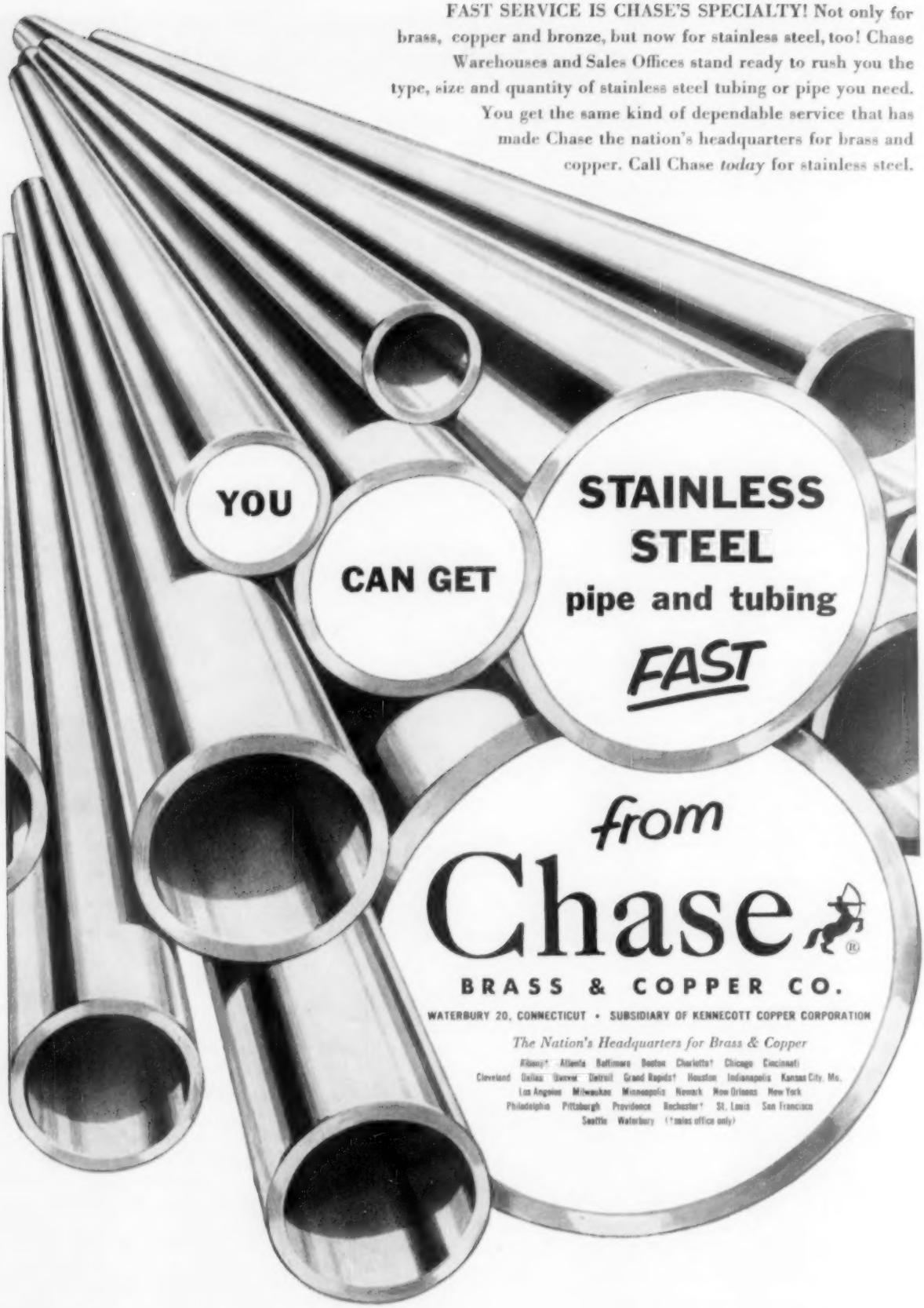
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ELECTRIC LOGGING—59

How Do Guard Electrodes Differ From Laterologs?

by R. I. Martin

WHILE the Guard Electrode is not different basically from Laterolog 3, recent developments are worth noting.

We mentioned that the performance of an electrode arrangement consisting of long electrodes could not be calculated. Fig. 1 shows a type of model used to obtain resistivity curves. In this, the bed to be logged consists of material with appropriate resistivity. A circular hole represents the bore hole, and the bed or series of beds is secured at suitable depth. The metal tank is filled with liquid of desired resistivity. This represents both the mud in the bore hole, and the surrounding shale. Although there is no physical resemblance, it is equivalent electrically to a case where the mud resistivity is equal to that of the surrounding shale.

Author is assistant professor of petroleum engineering, Missouri School of Mines and Metallurgy.

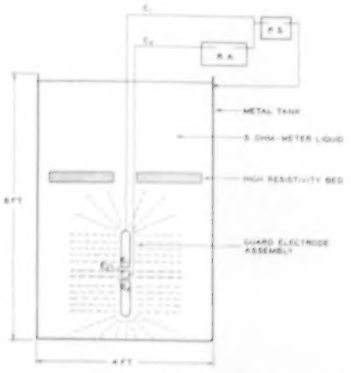

Fig. 1. Current-flow pattern for the Guard Electrode.

In Fig. 1, P.S. represents the power supply, and R.A., the recording apparatus. Current flow from the three electrodes is shown schematically. Near to the electrodes it is normal to their surfaces.

Fig. 2 shows the general assembly of the Guard Electrode for use in the field. Attached to the lower end of a logging cable is a ground electrode which is 20 ft. long. An S.P. electrode is placed near to the lower end of this ground electrode. An insulated coupling cable 20 ft. in length connects the guard electrodes, which are also 20 ft. long. The central electrode is about 3 in. long.

An innovation is to record a conductivity log as well as a resistivity curve. It is possible to do this by suitable instrumentation, and the two logs are recorded simultaneously. An advantage of the conductivity log is that it gives considerable detail in regions of low resistivity. That is, it provides a detailed curve for shale sections which is somewhat similar to an amplified normal resistivity curve given on some other logs.

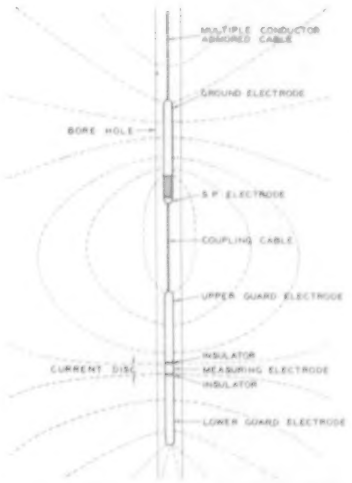

Fig. 2. General assembly of the Guard Electrode. From Gwen and Greer, "The Guard Electrode," Trans. A.I.M.E. Vol. 192, 1951.

Fig. 3 shows a comparison of a conventional log, a single-electrode log, and a Guard Electrode log. The differences between the resistivity scales in each case should be noted.

The single-electrode log measures a resistivity which is affected by the invaded zone at the left-hand end of the log. It records low resistivities at the other end. In contrast, the Guard Electrode is less affected by the invaded zone and measures high resistivities opposite the resistive sands. Detail given by the conductivity log should be noted.

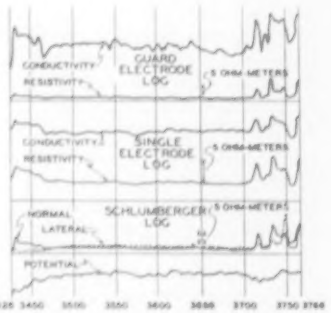

Fig. 3. Comparison of a conventional log, a single-electrode log, and a Guard Electrode log.

LUBE OIL ADDITIVES—5

How Film-Strength Improvers and Dyes Are Used

by J. Brent Malin

THE high degree of churning and whipping which occurs in the crankcase of an engine provides an ideal opportunity for an oil to become aerated and consequently to froth and foam The foaming tendency is greater with the more viscous oils and with those oils that have been reinforced with detergent additives.

There are a number of compounds which will decrease the foaming tendencies of an oil, but the most effective by far is a silicone polymer. Even when used in extremely low concentration, ranging from 0.0001 to 0.001 per cent, the defoaming properties are clearly evident. Consequently, with the popular use of detergent motor oils, the use of the silicone defoamer has become widespread and even extends to gear oils.

Film-strength improvers . . . There are a number of compounds which, when added to a lubricating oil, seem to increase its load-carrying ability. Early compounds of this type were principally fatty acids. But with the advent of higher load-carrying copper-lead bearings, it became necessary to use a less corrosive material. Typical of the newer materials are sulfurized natural fats and oils. Similarly, some of the antioxidant additives exhibit secondary effects that show mild film-strength improvement.

The additional load-carrying ability imparted by these additives seem to come through the preferential attachment of one part of the molecule to the metallic surface. This is while the oleophilic, oil-soluble part of the molecule remains extended in the oil. This action is not to be confused with additives known as E.P. (extreme pressure) compounds. Such materials combine chemically with these metal surfaces and tend to prevent the galling which might otherwise occur.

The molecules of film-strength improvers apparently adhere to metallic surfaces through an "ionic" attraction. This is similar to the attraction which holds chemical elements together in the form of chemical compounds.

When high mechanical-load conditions are encountered and the moving metallic surfaces are forced close together, most of the oil is squeezed from between the surfaces. But the polar molecules, with some oil entrained, remain in place and serve as a cushion which tends to keep the metallic surface apart. A highly simplified version of their action is shown in Fig. 5.

Scoring reduced . . . The use of film-strength improvers tends to reduce scoring and scuffing of "raw" metal in piston rings and cylinder walls during the break-in period of a new engine. Similarly, it helps the more heavily loaded moving parts, such as distributor drive gears, cam noses, etc., to carry out their assigned duties without encountering undue wear.

On the basis of the long and unsatisfactory history that has been compiled with conventional lubricating oils, it would appear that the film-strength and load-carrying properties of such oils have been quite adequate. Thus there has been little demand for oil additives that will give even greater protection. The possibility always remains, however, that new engine designs may impose greater film-strength demands through higher valve lifts, higher speeds, and heavier loads, meanwhile with proportionately smaller mechanisms. If this should occur, and it appears that perhaps the trend has begun, then interest in these materials may expand.

Dyes

A number of the additives which go into high-grade finished oils often detract from the color or "bloom" that for years has been associated with high-quality oils. Consequently, even though the additive oils are considerably better than their forerunners, it is sometimes difficult to convince the customers. To overcome or forestall such objections, dyes are sometimes used to mask or recolor the oil to a shade believed to be more acceptable to the public.

A second use for oil dyes is now appearing. Some of the new oils are inherently so light in color that it is difficult to observe the level of the oil on the engine dipstick. Dyes are therefore added to color the oil and make dipstick reading easier.

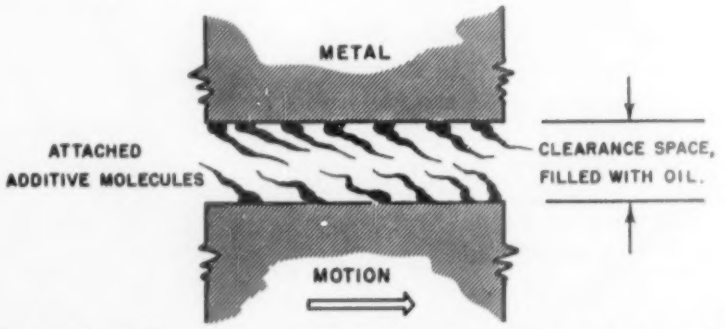

Fig. 5—This simplified diagram shows how polar molecules, with some oil entrained, remain on the moving metallic surfaces and form a cushion that tends to keep the metals apart.

Author is with E. I. du Pont de Nemours & Co., petroleum chemical division.

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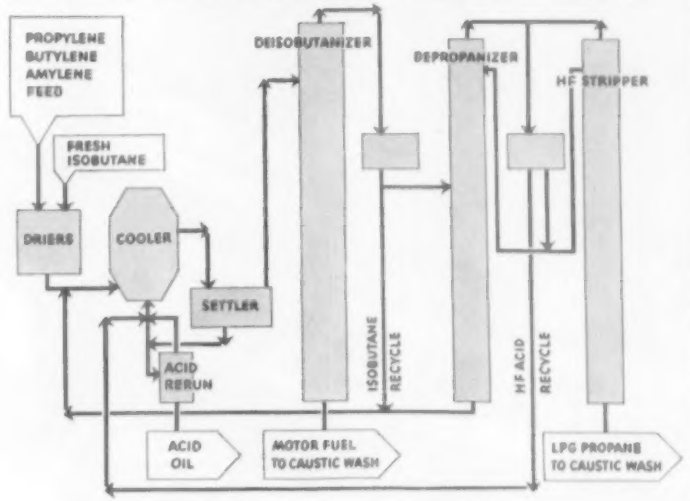

Liquid feed, containing olefins and isobutane, is passed through driers and fed into a cooler along with liquid recycle hydrofluoric acid. Hydrocarbons and recycle acid then flow to the settler. The acid phase is recycled to the cooler. The hydrocarbon phase is fractionated to separate high octane motor fuel alkylate from recycle isobutane.

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Pipeline Patrol

. . . Report on Construction

Under Way, Contracted, and Planned

PIPELINE activity as reported below by The Oil and Gas Journal is compiled from information received from pipeline companies and contracting firms.

These projects include those planned, proposed, under way, and contracted. Uncontracted projects are indicated by • preceding the job.

Crude-Oil Pipelines

Ar-Mex Pipe Line Co.—Company has applications for two lines before the Office of Defense Mobilization Board for rapid amortization approval.

1. A crude-oil line from Albuquerque, N. M., to Phoenix, Ariz. This line would serve a 20,000-bbl. refinery being planned by Frost & Associates of Dallas.

2. A crude-oil line from Guernsey, Wyo., to Albuquerque.

• **Big Horn Pipe Line Co.**—Firm has asked Wyoming Public Service Commission for permission to build a 150-mile, 8-in. crude-oil line from Ash Creek field, Wyoming, to a connection with Service Pipe Line Co.'s line at Midwest, Wyo.

• **Butte Pipe Line Corp.**—This joint venture of Shell Pipe Line Corp. and Murphy Corp. has announced plans for a 450-mile, 16-in. line from eastern Montana to Wyoming. The line will deliver to big-inch carriers which start in eastern Wyoming.

Magnolia Petroleum Co.—Company has let contracts on 215-mile, 12, 14, and 16-in. crude line from Midland to Corsicana, Tex. O. R. Burden Construction Corp. has the western half of the line and H. B. Zachry Co. has the eastern half. Work is scheduled to be finished by October.

Magnolia Petroleum Co. — This company will operate a 48-mile, 12-in. submarine pipeline for itself and Continental Oil Co., and Newmont Oil Co. The line will run to blocks off the coast of St. Mary's Parish, Louisiana, and will have a capacity of 50,000 bbl. per day. Brown & Root, Houston, has the contract and expects to be finished by the middle of 1955.

• **Malco Pipeline, Inc.**—Company is planning a 40-mile, 4-in. line from South Blanco Tocito field in Rio Arriba County, New Mexico, to Bloomfield, San Juan County, New Mexico. Completion set for 1955.

Standard Pipe Line Co.—Company plans to build two crude lines. Applications are now before the Office of Defense Mobilization for rapid amortization approval.

1. A 350-mile, 16-in. crude line from Glendive, Mont., to Guernsey, Wyo., to connect with Platte Pipe Line Co.'s system there.

2. A 330-mile, 16-in. crude line from Wink, Tex., to Albuquerque, N. M. This line would serve a 10,000-bbl. refinery being planned by Frost & Associates of Dallas.

• **Stanmount Pipeline Co.**—Company is seeking permission to build a crude-oil line from fields in North Dakota to Cromer, Man., where it would hook up with the Interprovincial line. The line would cost $6,000,000. Size not known.

Trans Mountain Pipe Line Co.—Engineers Limited Pipeline Co. has contract to lay 27 miles of 20-in. from Laurel to Burlington, Wash., and 9 miles of 16-in. of lateral to Shell Oil Co.'s new refinery at Anacortes, Wash. The $2,750,000 job will begin in spring and end July 31.

• **West Coast Pipeline Co.**—The off-again-on-again plans for this crude line from near Wink in West Texas to near Norwalk in California are presently before the Office of Defense Mobilization. A three-man board of nonindustry members recently recommended that the project be dropped. They questioned the ability of West Texas to produce enough crude to supply both the East and West Coasts in time of war. The three-man board favored building a line from California's Elk Hills Naval Reserve to be held in standby for possible future need.

Products Pipelines

• **American Pipe Line Co.**—Has received ODM approval to amortize 40 per cent of $178,000,000 with a rapid writeoff on proposed line to run from Gulf Coast area to New York City area. Bids for pipe requested.

• **H. W. Bass & Sons, Inc.**—Company is planning on a 152-mile, 4-6-in. L.P.G. line from Goliad Corp.'s plant in Live Oak County, Texas, to Corpus Christi.

• **California - Oregon Pipe Line System.**—103 miles 6-in., proposed, Crescent City, Calif., to Medford, Ore.

• **International Pipe Line, Inc.**—132 miles, 8-in., proposed, Wrenshall to Minneapolis, Minn. Cost: $4,200,000.

Moore Stoner Co.—Company has $2,500,000 tax amortization for a 200-mile, 6-in. products line from a connection with Oil Basin Pipe Line Co.'s terminal at Glendive, Mont., to Minot, N. D.

Okan Pipe Line Co.—This subsidiary of Warren Petroleum Corp. has awarded work to two contractors for its L.P.G. line from western Oklahoma and Kansas to Tulsa. Vaughn & Taylor Construction Co. has 260 miles of 3 to 6-in. gathering lines, and R. H. Fulton has 140 miles of 6-in. transmission line from western Oklahoma into Tulsa.

• **Products Pipe Line Co.**—This subsidiary of Goliad Corp. has received a fast writeoff for 40 per cent of $126,000 and 25 per cent on $1,781,000 for L.P.G. line from the Wilcox natural-gasoline plan in Lavaca County, Texas, to Texas City. Panama-Williams Co. has contract. Completion scheduled for midsummer.

Shell Pipe Line Corp.—65 miles of 12-in. products line from Baton Rouge, La., to Shell's Norco refinery. Houston Contracting Co. has contract. H. T. Muckley, Supt. Job to be completed in June.

Sioux Oil Co.—Company will build a 55-mile products, 8-in. line from its Newcastle, Wyo., refinery to Rapid City, S. D.

Southern Pacific Pipeline, Inc.—Company has let eastern sections of its 800-mile products line from Los Angeles and El Paso into Phoenix and Tucson. Morrison-Knudsen Co., Inc., and River Construction Co. have the 180-mile section between El Paso and Lordsburg, N. M. The remaining 150 miles into Tucson will be done by R. H. Fulton Co. The size of the line is 16-in. from Los Angeles to Colton, Calif., 12-in. from Colton to

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• **Sunflower Pipe Line System.**—Company proposes to build a 215-mile, 6-in. line to transport L.P.G. from six counties in western Kansas to Wichita. Application approved by Kansas Corporation Commission.

Texas Eastern Transmission Corp.—Company has received Federal Power Commission approval to abandon the "Little Inch" gas line and to convert it to products service. The company will spend $13,000,000 converting the line back to products. When finished the line will have a capacity of 235,000 bbl. daily.

Natural-Gas Pipelines

• **Alabama-Tennessee Natural Gas Co.**—Company has proposal before FPC to lay 21 miles of 12-in. line west from its present line in Colbert County, Alabama.

• **American-Louisiana Pipe Line Co.**—1,121 miles of 30 and 22-in., 30-in., proposed, extends from North Tepetate, Acadia Parish, Louisiana, to near Detroit. The 22-in. starts near Payne, Ohio, extends to Bridgman, Mich. Estimated cost: $130,000,000. FPC approved.

• **Arkansas Louisiana Gas Co.**—136 miles of new line proposed, to be added to present system in Arkansas, Louisiana, and Texas. Estimated cost: $9,245,166. FPC approved.

Atlantic Seaboard Corp.—Company has received FPC authority to lay 84 miles of natural-gas line in West Virginia, Virginia, and Maryland. The 26-in. line will parallel existing lines between Cobb, W. Va., and Baltimore. The job will cost $9,281,500 and will include 2,000 hp. additional compressor capacity. Finish scheduled for this summer.

• **Carolina Natural Gas Corp.**—185 miles 2-12-in., proposed lateral lines off Transcontinental in North and South Carolina.

• **Central Hudson Gas & Electric Corp.**—Company has filed application with FPC to construct 48 miles of 12-in. line from Albany to Kingston, N. Y. Line will be started and completed in 1955 if FPC approves.

• **Cities Service Gas Co.**—Company has applied to the Federal Power Commission for permission to build a 93-mile, 26-in. natural-gas line from Blackwell, Okla., to Independence, Kans. The company also proposes to build a 145-mile gathering system in Woods County, Oklahoma, and Barber County, Kansas. The two jobs will cost $8,422,400.

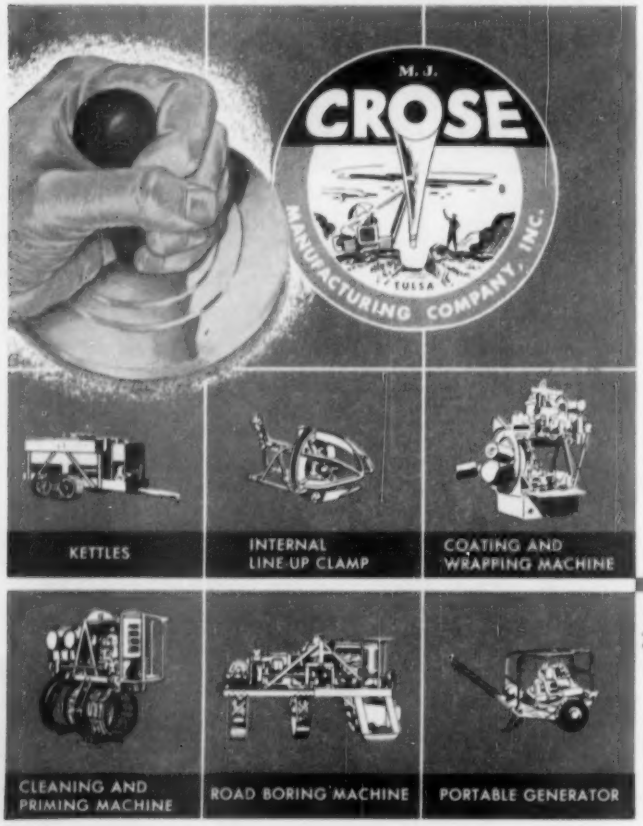
• **Clinchfield Coal Corp.**—Company has filed permit with Federal Power Commission for authority to build 16-mile, 12-in. line from Dickenson County, Virginia, to near Osborne Gap, Ky. The company is primarily a coal producer.

• **Coastal Transmission Co.**—Company plans to build 550 miles of 30-in. line from near McAllen in South Texas to near Baton Rouge (See Houston, Texas Gas & Oil Co.)

Colorado Interstate Gas Co.—Company has let first part of its 380-mile, 22-in. line from Rock Springs, Wyo., to Denver to Houston Contracting Co. The construction firm is working on 126 miles from near Laramie, Wyo., to Denver. The line will pick up its gas from Pacific Northwest at Rock Springs.

Colorado Interstate Gas Co.—Company is also spending $4,200,000 extending its gathering lines in the Panhandle of Texas, Oklahoma, and Kansas. Work will be done this summer.

• **Colorado-Western Pipe Line Co.**—454 miles of undetermined size pipe planned between Cortez in Montezuma County and Denver. Line would serve towns of Montrose, Gunnison, Salida, Fairplay, and South Platte, Colo. Estimated cost: $30,000,000. Company also plans 254 miles of laterals to



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328-mile line, proposed, to run from a point in La Plata County in southwestern Colorado over the Continental Divide along the eastern slope to serve Pueblo, Colorado Springs, and Denver. Estimated cost: $21,600,000.

East Ohio Gas Co.—Company has let contract to Williams Brothers Co. to lay 112 miles of 30-in. from Maumee, Ohio, to Cleveland. Completion is set for October 1.

• **El Paso Natural Gas Co.**—Company has three plans ready to present to the FPC to increase its California capacity. The preferred plan calls for the company to loop its 500-mile, 34-in. line from the San Juan basin to the California border. If this fails to win approval, the firm will offer to build a 30-in. line from Pacific Northwest's line at Mountain Home, Idaho, to the San Francisco area. Another plan is to build a 30-in. line from near Pendleton, Ore., into California. Company feels the looping program will be required even if one of the alternate plans would win approval.

Company has FPC approval for 74 miles of line and 6,925 hp. additional compressor power in Texas, New Mexico, and Arizona. The cost will be $13,869,013.

• **Hope Natural Gas Co.**—Proposing to build a 22½-mile extension of existing line from Boone County, West Virginia, to Logan Mingo county line, West Virginia. Estimated cost: $930,000.

• **Houston, Texas Gas & Oil Co.**—Company plans to build 600 miles of 30-in., and 350 miles of 18-24-in. line to carry natural gas from Baton Rouge to Miami. Line will join with Coastal Transmission's proposed line from McAllen, Tex.

• **Kansas-Nebraska Natural Gas Co., Inc.**—Proposes to construct 206 miles of 6-12-in. pipeline to add to present system in central and northeastern Nebraska.

• **Lone Star Gas Co.**—Company has two plans up before FPC to enlarge its system in Texas and Oklahoma. One is for an $18,000,000, 230-mile line from Cotton County, Oklahoma, to Fritch, Tex. The other plan is for a 205-mile line from Snyder, Tex., to a hookup with the Cotton-Fritch line. The company hopes to prevent Natural Gas Pipeline Co. of America from building its line from Wise County, Texas, to Fritch (see below).

• **Lone Star Gas Co.**—Firm has applied to FPC for permission to build a 230-mile natural-gas line from Cotton County, Oklahoma, to Fritch, Tex. The line would deliver gas from Lone Star's connections in the Golden Trend fields in Oklahoma to Natural Gas Pipeline Co. of America at Fritch.

• **Michigan Consolidated Gas Co.**—25 miles, 12-in., proposed, from near Sparta to Muskegon, Mich.

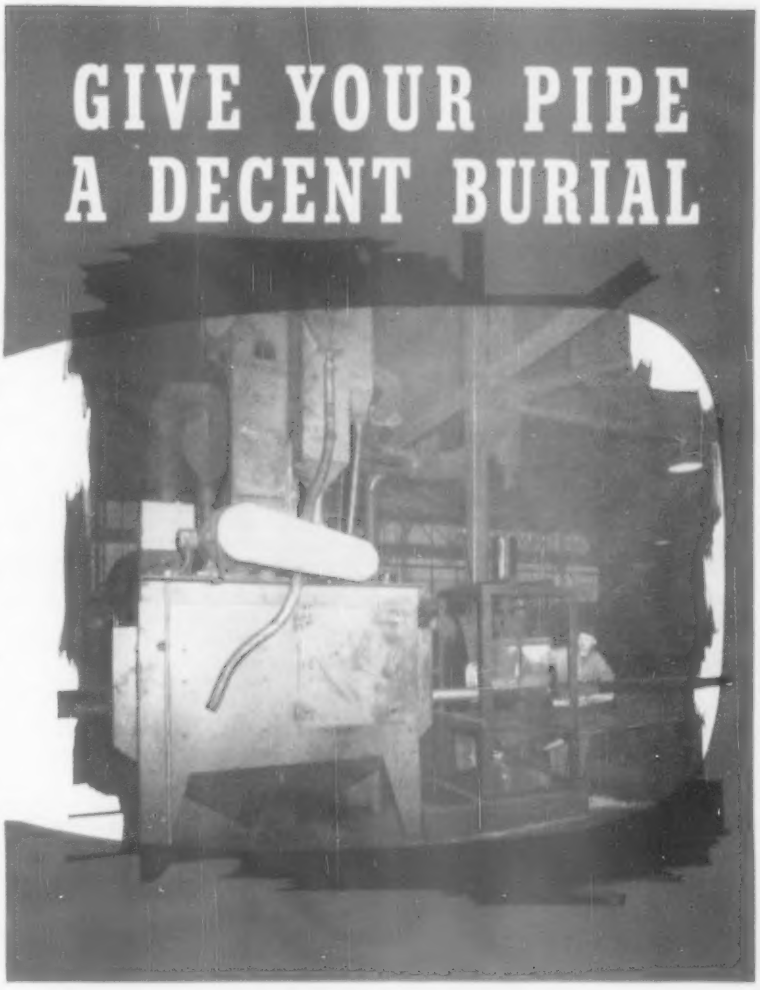
• **Michigan Gas Storage Co.**—Company has applied to FPC for permission to construct 36 miles of 16-in. natural-gas line from Mount Pleasant Junction to Milwaukee, Mich. The project will cost approximately $2,572,000.

• **Michigan Wisconsin Pipe Line Co.**—251 miles, proposed, 24, 18, 12, 6, and 4-in. loops. Majority will be in Wisconsin.

• **Missouri Public Service Co.**—136 miles, 8-10-in., proposed, New Franklin to Trenton, Mo.

• **Natural Gas Pipeline Co. of America.**—Company plans to start work in July on 350 miles of 20 and 26-in. line from Wise County, East Texas, to its station 111 at Fritch, Tex. Job expected to be completed by December.

• Company also plans to start 31 miles of 36-in. in July from Herscher, Ill., to a



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Pipeline Patrol

connection with Texas Illinois pipeline near Joliet, Ill. Job slated to be finished in November.

Natural Gas Producers, Inc.—Company has let contract to Houston Contracting Co. for 49 miles of natural-gas transmission line and 13 miles of distribution lines. The job will cost $1,374,000 and is expected to be completed in early July.

Nevada Natural Gas Co.—Company plans looping program along its 114-mile line from Needles, Calif., to Las Vegas, Nev. Mileage and size are unknown but cost will be about $2,500,000.

● **New River Gas Co.**—50 miles, planned, Summers to Monroe counties, West Virginia, to Narrows and Dublin, W. Va.

● **New York State Natural Gas Corp.**—Company plans to start laying in June 18 miles of 20-in. pipe from Homer, Cortland County, New York, to its station in Otisco, Onondaga County, New York.

● Company also has plans for 21 miles of 20-in. from Genessee Falls, Wyoming County, New York to York, Livingston County, New York. No definite starting or completion dates announced.

● **Niagara Mohawk Power Corp.**—Company plans no major transmission lines for 1955. However, itp lans to add more than 300 miles of distribution mains.

● **North Indiana Fuel & Light Co.**—Company has awarded H. L. Gentry Construction Co. 30 miles of 10-in. and 15 miles of 6-in. natural-gas lines. Work will be completed near the middle of June.

● **Northern Natural Gas Co.**—Company has the following jobs before the FPC for approval.

● Canadian Extension—188 miles of 24-in. from Canadian border to near Wahpeton, N. D. 215 miles of 30-in. from Wahpeton to Farmington, Minn.

● South Dakota Extension—94 miles of 12-in. from Sioux Falls to Waterton-Huron. 71 miles of 10-in. from Waterton-Huron to Duluth-Superior.

● Duluth-Superior Extension—167 miles of 24-in. from Farmington to Duluth-Superior.

● Company has also asked FPC permission to build and operate $4,800,000 worth of pipeline facilities for use in testing an underground natural-gas storage field near Redfield, Iowa. The project would involve construction of 29 miles of 30-in. pipe.

Pacific Gas & Electric Co.—Company is working on 18 miles of 12-in. from Beehive Bend field to W/O Gridley in California. The job is slated for completion in September.

● Company plans 21 miles of 16-in. line from Marysville to Lincoln, Calif. Job will start in June and wind up in September.

● Company's long-range plans call for looping the Topock-Milpitas line with 135 miles of 34-in. The major part of the line will be laid in 1956, while 62 miles will be laid in 1957.

Pacific Northwest Pipe Line Corp.—Firm has let the initial contracts of its 1,466 miles gas line from the San Juan basin to Bellingham, Wash. The first contracts total $11,236,000. Contractors and their sections are:

River Construction Co., two sections totalling 150 miles of 26-in. between Ignacio, Colo., and Moab, Utah.

R. H. Fulton Co., two sections totalling 160 miles of 26-in. between Moab and Jensen, Utah.

Associated Pipeline Contractors, Inc., one section of 77.6 miles of 26-in. between Jensen and Green River, Wyo.

A. J. Curtis Construction Co., one section of 82.8 miles of 22-in. from Green River to Sage, Wyo.

B & M Construction Corp., one section of 90 miles of 22-in. between Sage and Lava Hot Springs, Idaho.

Midwestern Constructors, Inc., one section of 95 miles of 22-in. from Lava Hot Springs to Burley, Idaho.

● **Panhandle Eastern Pipe Line Co.**—Company has plans to loop Peoria lateral before FPC now. The line would be 16-in. pipe running 58 miles from near Springfield to Peoria, Ill.

● **Pine Tree Natural Gas Co.**—204 miles of undetermined size pipe to run from the Boston area to Bangor, Me.

Private Interests.—Proposes to build gas line from Gubik gas field near Navy Petroleum Reserve No. 4 in Alaska to Fairbanks. Line would be 450-mile, 8-in. line and Arctic Contractor, Inc., who handled engineering requirements and preliminary design, estimated the line would cost $20,000,000, although later figures have been much higher than this.

South Georgia Natural Gas Co.—Company has let contracts on work approved by the FPC in 1954. The total cost of the projects is nearly $9,000,000.

Buchanan Pipe Line Co. has 85 miles of 3, 6, and 8-in. line in the State of Georgia.

Hallmac Construction Co. has 97 miles of 10-in. line from Albany, Ga., to Ellaville, Fla.

Mid-States Construction Co. has 110 miles of 2, 4, 6, and 12-in. line in Alabama and Georgia. Seventy-one miles of the line is 12-in. from Phenix City, Ala., to Americus, Ga.

Thomason & Associates, of Montgomery, Ala., has 35 miles of 12-in. and about 8 miles of smaller in Alabama and Georgia.

Tennessee Gas Transmission Co.—Company has awarded Oklahoma Pipe Line Constructors 113 miles of 24-in. natural-gas line from near Covington to Laska-Waxen, Pa. The work has started.

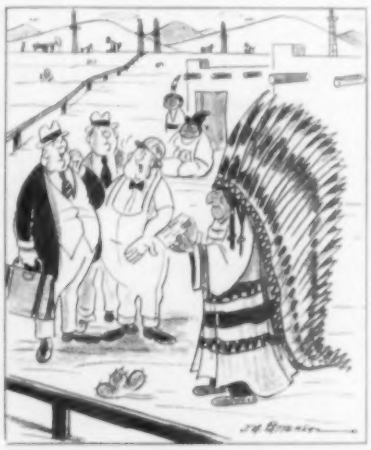
Company has also awarded H. C. Price Co. 130 miles of 24 and 26-in. pipeline in Ohio and Pennsylvania.

● Company has also received FPC permission to construt a 30-in. line, 370 miles long from Agua Dulce, Tex., to Kinder, La. The line will cost $35,400,000.

● **Tennessee Gas Transmission Corp.**—Firm has requested FPC permission to spend $56,000,000 in new pipeline and compressor facilities. The work will include 221 miles of 26 and 30-in. loops in Kentucky and Ohio and 376 miles of gathering lines in Louisiana and Texas. Some 12,540 hp. would be added at new and existing compressor stations in Louisiana, Mississippi, and Texas.

Texas Eastern Transmission Corp.—Company has let 134 miles of 30-in. high-pressure natural-gas pipeline in the states of Mississippi and Louisiana to H. C. Price Co.

● Firm also has plans to build 382-mile, 24-in. line from Kosciusko, Miss., to connect



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Pipeline Patrol

with an existing 30-in. line at Connellsville and replace the Little Inch line in moving natural gas. Cost will be $71,000,000.

• **Texas Gas Corp.**—This firm will spend $3,500,000 on a line from Orange, Tex., to a connection with a new line of Transcontinental Gas Pipe Line Corp. in Cameron Parish, Louisiana. The project will call for crossing the Sabine River, building a compressor station, and a measurement station.

Texas Gas Transmission Corp.—Company has big building program set to start soon and end approximately November 1.

From Covington, Ky., to Jefferstown, Ky., company will build 77 miles of 26-in.

Company will loop 14 miles of 20-in. at Vaughton, La.

Will build 72 miles of 12-in. from Hardinsburg, Ky., to Bedford, Ind. Also will build 5 miles of 8-in. near Bedford.

From Bastrop, La. to Clarksdale, Miss., the company will lay 50 miles of 30-in.

From Eunice, La., to Morgan City, La., the firm will lay 105 miles of 20 in.

Transcontinental Gas Pipe Line Corp.—Company has awarded the following contracts to lay 315 miles of 36-in. and 219 miles of 30-in.

O. R. Burden Construction Corp. will lay 5.31 miles of 36-in. and 25 miles of 30-in. in Louisiana.

Associated Pipe Line Contractors, Inc., will lay 63 miles of 36-in. in Louisiana and Mississippi and 71 miles of 30-in. in Virginia and Maryland.

Midwestern Constructors, Inc., will lay 14 miles of 30-in and 54 miles of 36-in. in Alabama and Georgia.

Western Constructors will lay 77 miles of 36-in. in Georgia and South Carolina.

Panama-Williams Co. will lay 36 miles of 30-in. and 31 miles of 36-in. in South Carolina and North Carolina.

Williams Brothers Co. will lay 72 miles of 30-in. in Virginia.

Transok Pipe Line Co.—Company has let contract to Pipe Line Service Co., Seminole, Okla., to lay a 140-mile, 24-in. line from Garvin County, Oklahoma, to Tulsa. The firm will also build a gathering system in the Bradley, West Lindsay, and Northwest Purdy fields.

• **Trunkline Gas Co.**—Firm has applied to FPC for authority to build eight new compressor stations and 24 miles of pipeline on its transmission system to enable it to sell additional gas to Panhandle Eastern Pipe Line Co. Total capacity of the new stations would be 56,000 hp. Total cost would be $18,700,000, including $1,000,000 for gathering facilities in the Gulf Coast area. Panhandle filed for 1,600 hp. additional compressor capacity to cost $3,714,000.

• **United Gas Pipe Line Co.**—Company has applied to FPC for permission to construct 63 miles of 16 and 20-in. natural-gas line in Mississippi, Alabama, and Florida. The company will also add 330 hp. to its compressor stations. Cost for the job will be about $8,300,000.

• **Utah Natural Gas Co.**—Planning 40 miles from Orem to Salt Lake City, 16-in. pipe at later date. Contract not yet let.

Virginia Natural Gas Co.—153 miles, Buckingham to Richmond and Portsmouth, Va.

Wilcox Trend Gas Gathering System, Inc.—Company is spending over $1,000,000 building gas-gathering lines and compressor stations in the Cuero-Goliad area of South Texas.

Foreign Crude-Oil Pipelines

• **Atlas-Dresser.**—Included in this company's agreement with the Argentine Government are plans to build a 400-mile, 16-in. crude line from Plaza Huincul area to Bahio Blanca.

Bolivian Government—Williams Brothers has contract to build a 220-mile, 6-in. crude-products line from Cochabamba to Orura to La Paz. The line is described completely in The Oil and Gas Journal of May 16, 1955, page 136.

• **Peace River Oil Pipe Line Co., Ltd.**—Company has been granted a permit to lay a 106-mile line from Sturgeon Lake field in Northwest Alberta to the Edson pumping station of Trans Mountain Oil Pipe Line Co., Ltd. The project will include a 16-in. line from Sturgeon Lake to Iosegun Lake and a 12-in. line from there to Edson. Capacity will be 58,000 bbl. daily.

• **Petroleos Mexicanos.**—145 miles, 12-in. considered, 18 de Marzo field via Reynosa to Monterrey, Mexico.

100 miles, planned, Isthmus of Tehuantepec, Jose Colomo to El Plan field, Minatitlan.

72 miles, 12-in., proposed, Poza Rica to Atzacapotzalco, Mexico.

• **Standard - Vacuum Oil Co.**—Company has long-range plans for a 90-mile pipeline to give the new Lirik field in Central Sumatra an outlet. Completion is not scheduled before 1957 or 1958.

• **Westspur Pipe Line Co.**—This company sponsored by Imperial Oil, Ltd., proposes to build a crude-oil line from southern Manitoba and Saskatchewan to a connection with the Interprovincial system running from Edmonton to Sarnia.

Yacimientos Petroliferos Fiscales Bolivianos—Williams Brothers also has contract to build a 230-mile, 6-in. products line from Cochabamba-Oruro-La Paz. The line will cost approximately $7,000,000. The Bolivian Government will eventually add a 10-in. products line from Oruro to Arica, Chile.

• **Others.**—For plans for further crude lines in Canada that have not yet been fully formulated, see The Oil and Gas Journal, April 4, page 79.

Foreign Products Pipelines

• **Empresa Nacional del Petroleo.**—80 miles, 6⅝-in., planned, Concon to Santiago, Chile.

• **Governments of South Rhodesia and Portuguese East Africa.**—200 miles, considered. Beria, Portuguese Mozambique to Umtalia, Southern Rhodesia.

• **Iraq Petroleum Co., Ltd.**—Company is making plans to lay a 75-mile, 24-in. products line from Homs, Syria, to Tripoli, Lebanon. The line would have a capacity of 180,000 bbl. daily.

• **National Fuel Oil Co.**—This company in Israel is a shareholder in a company which plans to build a products line between Haifa and Tel Aviv. The plans call for a 55-mile 6-in. line in which the Government would own 10 per cent.

"Give him 1,000 gallons—I'll wash his windows and tidy up the place."

• **National Iranian Oil Co.**—Company plans $32,300,000, 573-miles, 10-in. products pipeline from Ahwaz to Teheran, Iran. The line will have a capacity of 40,000 bbl. daily. Costain-John Brown, Ltd., London, will build the 337-mile southern part. Entrepose, Paris, will build the northern 236 miles.

• **North Atlantic Treaty Organization (NATO).**—This defense organization is building products lines to airforce bases in various parts of France. Approximately 2,000 miles of 4-10-in. line will be laid.

Oleoducto del Pacifico, S.A.—Company is building 100-mile, 6 and 8-in. products line from Buena Ventura to Cali, Colombia. Pipeline Engineering Co. of Dallas, Tex., has the contract.

Overland Pipeline Corp.—This South African firm has requested government permission to build a 350-mile line, to cost $8,450,000, from the South African coast to Rand, a plateau area in southern Transvaal where there is heavy petroleum consumption.

• **Petroleos Mexicanos.**—124 miles, 6-in. planned, Lagos to Guadalajara, Mexico.

54 miles, 6-in. planned, Lagos to Aguascalientes, Mexico.

82 miles, 8-in. planned, Salamanca to Lagos, Mexico.

• **United States Government.**—375 miles, 12-in., planned, St. Nazaire to Melun and Metz, France.

• **United States Navy Department.**—Proposed 300-500-mile line to be built in Spain to serve a proposed naval base and four large air bases which are also proposed under a defense agreement with the Spanish Government. No definite size or cost is known now.

Winnipeg & Central Gas Co.—Canadian company plans to build a $20 million butane-propane system. Company plans to get gas L.P.G. from Signal Oil & Gas Co.'s Tioga, N. D., plant and move it to Winnipeg. Size and route of the line has not been definitely established.

Foreign Natural-Gas Pipelines

Alberta Gas Trunk Line, Ltd.—This Canadian firm has let engineering contracts to two firms, Dutton, Williams Brothers, Ltd., and Mannix, Ltd., for a 300-mile, big inch gas-gathering system to collect Alberta's natural gas for transportation to Trans Canada Pipe Line Co.

Attock Oil Co.—Company plans to build 60-mile natural gas pipeline from Dhulian field to Rawalpindi in West Pakistan.

• **Canadian Western Natural Gas Co.**—Firm will begin work this spring on a $1,000,000, 59-mile natural-gas project in southern Alberta. The company will also add a compressor station at Lethridge, Alta.

• **Empresa Nacional del Petroleo.**—80 miles, 10-in., planned, Concon to Santiago, Chile.

• **Saskathewan Power Corp.**—Firm will build a 115-mile, 14-in. natural-gas line from Coleville gas field to Biggar and Saskatoon. The firm also plans a 105-mile, 10 and 12-in. line from Saskatoon to Prince Albery. The projects are scheduled for completion October 1.

Trans-Canada Pipe Lines, Ltd.—Company has postponed start of 2,250 miles of 24-34-in. line from Alberta-Saskatchewan border to Toronto and Montreal until next year because of financing difficulties. Company also plans a 24-in. lateral from Winnipeg to Emerson, Man. Twenty-inch lateral from Niagra to Toronto now in operation.

• **Westcoast Transmission Co., Ltd.**—Company has signed agreement with Pacific Northwest Pipeline Corp. and has revived plans for its line from the Peace River area of Alberta and British Columbia to the United States border near Sumas, Wash. Plans call for work to begin sometime this year. Company has also announced plans for a second line to parallel the first and to swing east into the Okanagan Valley.

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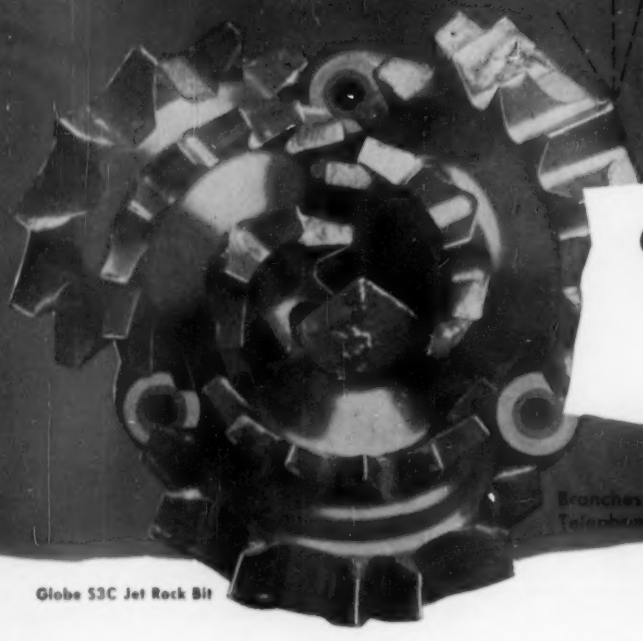

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Among the

Drilling Contractors

Fred Pool Drilling Co. has a new wildcat operation in northern Lea County, New Mexico. Contract is with Theron and Thomas Graves for a 5,500-ft. test. Location is for 1 Hooper, in 15-11-36, about 8 miles north of Tatum, and about 6 miles southwest of Echol field.

Mac Drilling Co., Houston, is drilling on a 3,000-ft. test 8 miles southeast of Seguin, in Guadalupe County, Southwest Texas. It is a contract job for James H. Eddy, of San Antonio, at 1 Zoboroski, in the J. B. Clements Survey.

W. L. B. Drilling Co., Houston, is drilling for Jack Frazier, of Houston, at 1 Young, a wildcat test southwest of Raccoon Bend field, in Waller County, Texas Gulf Coast. Location is about 7 miles southwest of Hempstead, in the John Irons Survey. It is a 4,500-ft. test.

Wise Drilling Account, Tyler, Tex., is drilling on a projected 5,000-ft. test 3 miles west of Troup, in Smith County, East Texas. It is a contract job for Watburn Oil Co. at 1 Towns, in the Jacob Lewis Survey.

Meadows - Townsend Drilling Co., Houston, has a new contract operation going for Starr Oil & Gas Co. about 10 miles northeast of Waller, in Waller County, Texas Gulf Coast. The test is listed as 1 William M. Rice Institute with location in the J. M. Stephens Survey, about 1¼ miles west of the one-well Fetzer field.

Dorris Ballew, Inc., Natchez, Miss., has contracted for another deep test M. J. Mitchell and David P. Dean will undertake in LaGrange field, in Adams County, Mississippi. Present production in the field is from Wilcox sands. The test, projected to 10,700 ft., will go to the Tuscaloosa. It is the operators' second deep test. Location, at 1 Stanton, in 91-7n-2w, is in the north part of the field.

Sunnyland Contracting Co., Rayne, La., will drill a Wilcox wildcat test 2 miles northeast of Natchez, in Adams County, Mississippi. It is a contract job for Douglas Whitaker, of Shreveport. Location is for 1 Cobb, in 12-7n-2w. Planned depth is 6,500 ft.

BBM Drilling Co., Houston, is scheduled for a 12,000-ft. test to be drilled for Houston Oil Co. on the east side of Roanoke field, in Jefferson Davis Parish, Louisiana Gulf Coast. It will be drilled as 2 Jarnigan, with location in 12-9s-4w.

J & C Drilling Co., Refugio, Tex.,

Combined crews on a rotary rig Howell, Holloway & Howell, Dallas contracting and operating firm, is running in Sadler field, Grayson County, in North Texas.

In the center foreground are: H. T. Howell (left), one of the owners, and H. B. Eppler, drilling superintendent.

Kneeling, in the row back of them, left to right, are: L. T. Brown, Dan Farmer, J. R. Bernard, C. G. Johnson, Carl McClendon, Clarence Gilmore, A. H. Odel, S. H. Dooly (driller), Harry Barnett, and E. M. King (driller).

Standing, left to right, are: Jack King, J. B. Mackey, Jr., Oscar Minyard, J. D. Cannon, William Jones (back of Cannon), James Dennis (driller), M. J. McKey, and H. C. Boggs. Picture was taken during rigging-up operations.

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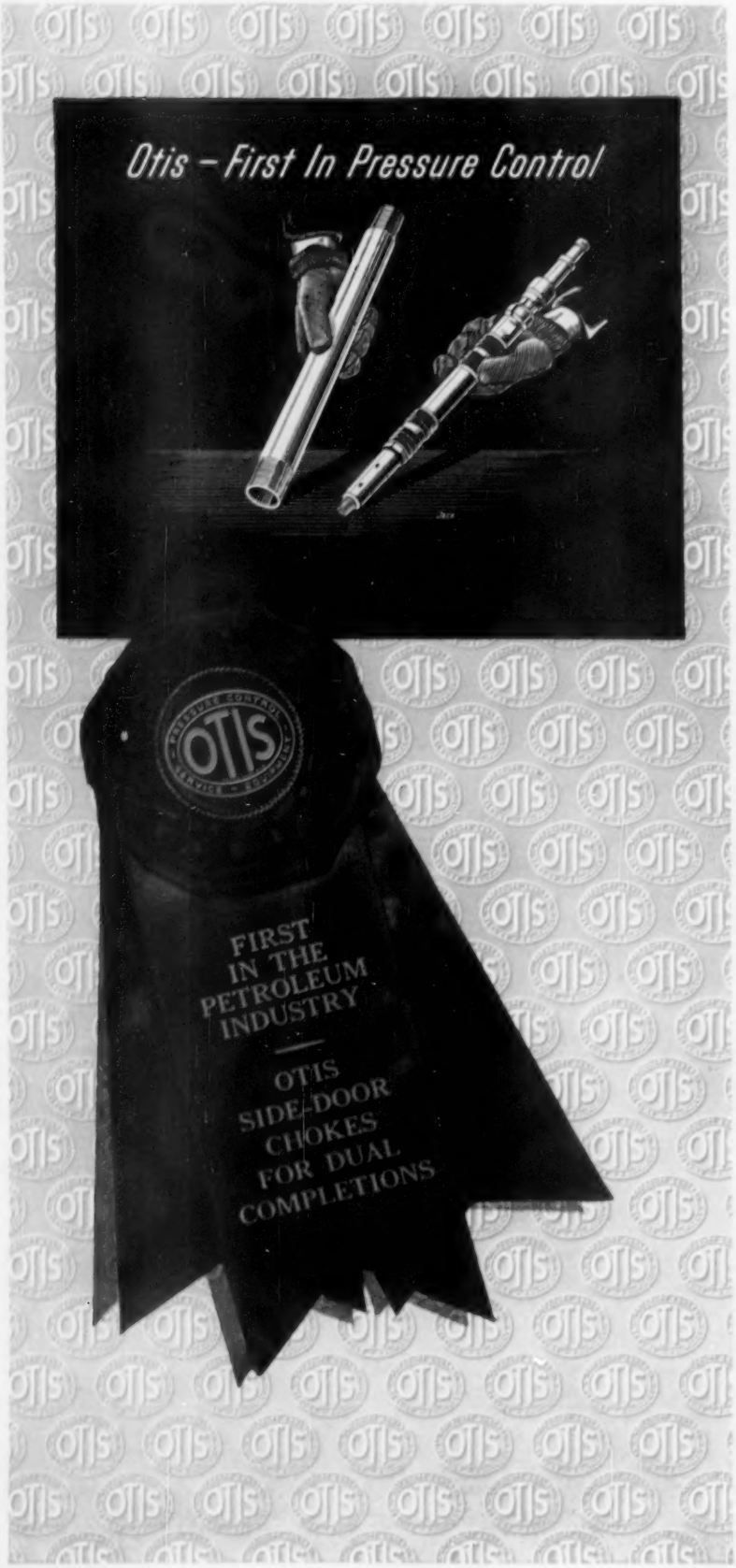

has a rig running at a wildcat location 3½ miles northwest of Nursery, in northwestern Victoria County, South Texas. It is a contract operation for Morgan Minerals Corp., of Corpus Christi. Objective is the Wilcox formation. Permit is for 9,000 ft. Listing is 1 Adcock, in the L. Navarro Survey.

Fletcher Drilling Co., Shreveport, has a new wildcat operation under way for Carpenter Oil Co. of Louisiana, Inc., of Lafayette, La., on the latter's large block southwest of Lamar field, in Franklin Parish, northeastern Louisiana. It is the operator's third test on the block. The new test, 1 Ward, in 7-15n-9e, is about 3 miles southwest of Lamar production. The first test was dry at 4,265 ft., and the second at 5,450 ft.

A **Woolf & Magee** rig is drilling Oakland Corp.'s newly started Wilcox test 3¼ miles southwest of Rosefield, in LaSalle Parish, eastern Louisiana. The test, 1 Hodges, in 10-10n-4e, is set to go to 4,000 ft.

Maxwell Herring is contractor on a 5,000-ft. test E. L. Howard of Tyler, Tex., is starting at a wildcat location 2 miles south of Craft in Cherokee County, East Texas. Location is for 1 Cortez, in the C. W. Miller Survey.

Atlas Drilling Co., Opelousas, La., has taken on a contract for a 9,800-ft. test for General Crude Oil Co. and Hurt Oil Co., Ltd., of Houston, on the DeQuincy prospect in southern Beauregard Parish, Louisiana. Location, on Lutcher-Moore land, in 16-7s-11w, near the Calcasieu Parish line, is about midway between Oretta and DeQuincy fields.

Harry L. Edwards Drilling Co., Houston, is under contract for a 12,000-ft. test to be drilled for Fifteen Oil Co., also of Houston, in the Grand Chenier area, in the coastal marshes of Cameron Parish, southwestern Louisiana. Location is on parish school land in 16-15s-5w.

Field Drilling Co., San Antonio, is scheduled for a 4,500-ft. wildcat test to be drilled for A. J. Kuenstler, of San Antonio, in Atascosa County, Southwest Texas. Location, at 1 Brite, in the S. Vasquez Survey, is about 4½ miles northwest of Jourdanton.

Dixie Drilling Co., Dallas, has the contract for the deep test Stanolind Oil & Gas Co. is undertaking in Block 24, Ship Shoal area, in the Gulf of Mexico off Terrebonne Parish, Louisiana. Location for the test, projected to 14,000 ft., is about 3 miles from shore.

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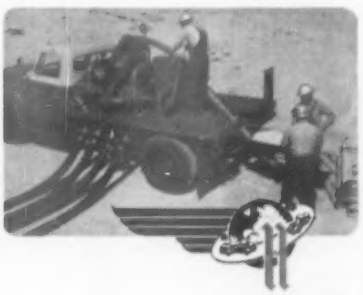

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EQUIPMENT MEN . . . in the News

Brakesol, Inc., Announces Sales Staff Appointments

BLACKWELL

Lester P. Brake, president of Brakesol, Inc., Oklahoma City, Okla., recently announced further expansion of the organization with the following promotions and new appointments. Cecil Blackwell has been appointed district sales engineer for the Gulf Coast area which will service East Texas, the Gulf Coast, and Louisiana. Elvin (Al) Grimsley has been appointed as sales engineer for the Louisiana district, and will headquarter at New Iberia.

J. W. PAGE

E. B. GRIMSLEY

J. W. Page has been promoted to district sales engineer with headquarters at Odessa, Tex. David Peters has been appointed to Odessa, Tex., as a sales engineer and will work under the supervision of Page.

D. W. PETERS

JIM REA

H. E. (Babe) Wright has been appointed sales engineer at Lovington, N. M., and will also be under the supervision of Page. George Lynch has recently been appointed as a sales engineer, with headquarters in Sidney, Neb.

Jim Rea has been transferred from Levelland, Tex., to Great Bend, Kans. He will service Kansas and the Texas Panhandle. Pat Curtin has been put in charge of the Oklahoma and North Texas area. His headquarters are in Oklahoma City. Dick Wernsman has been appointed sales engineer for the Illinois, western Kentucky area. He will headquarter in Salem, Ill.

Tucker to Represent Cummins in California

J. W. TUCKER

John W. Tucker has joined the field sales staff of Cummins Engine Co., Inc., Columbus, Ind., as a regional representative, with headquarters in Los Angeles, Calif. His appointment is announced by L. E. Williams, Cummins' manager of distribution.

Tucker has been associated with the truck and industrial power industry in southern California for 25 years. He worked for Hall-Scott Motor Co. from 1929 to 1952. In 1952 he joined the Cummins distributor for southern California, Cummins Service & Sales, as manager of industrial sales. In his new position, Tucker succeeds J. P. Jung, who is now the Cummins regional manager for the southeastern region, with headquarters in Atlanta, Ga.

Oilwell's Central Midwest Manager Makes Changes

Appointment of John R. Wilde as manager of the Pampa, Tex., store of U. S. Steel's Oil Well Supply Division; of Joseph M. Rogers as field representative at Gainesville, Tex.; and the promotions of Tommy Lee Adams to field representative at Abilene, Tex.; and R. P. Mitchell to field representative at Albany, Tex.—all have been announced by William Miskimins, manager of Oilwell's Central Midwest area.

Wilde was employed in 1943 at Oilwell's Pampa store. In 1944 he left the organization for a while, then returned as a storeman in 1945 at Odessa, Tex. In 1946 he was transferred to Pampa, and in 1948 was appointed field representative at that location. He served in that capacity until his present appointment.

A veteran of 24 years in the oil and supply business, Rogers goes to Gainesville from Abilene, Tex., where he has held a similar position since 1951. He joined Oilwell in 1946 with 15 years of oil-company experience. He started as a storeman at Odessa, Tex., and later served as manager of the division's stores at Denver City and McCamey, Tex., before becoming field representative at Abilene.

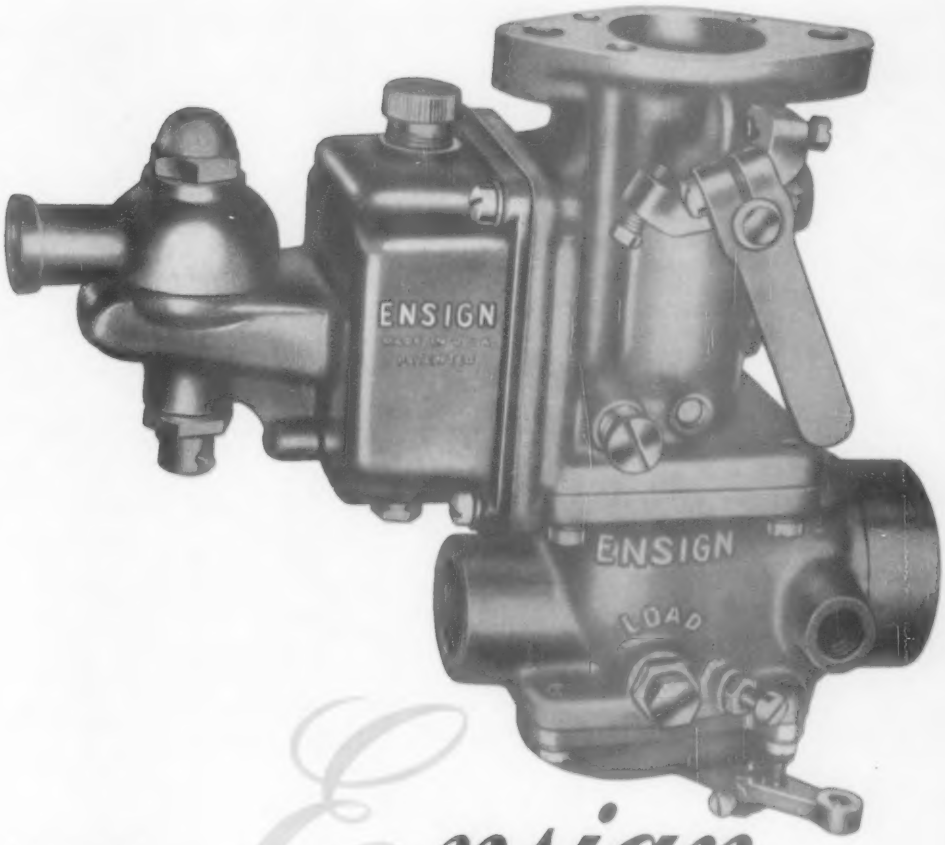
Adams has served as a storeman in

Chiksan Holds Sales Conference

The sales department of Chiksan Co. recently held a 3-day sales conference at the main office and plant at Brea, Calif., under the direction of G. R. Winder, vice president and general sales manager.

During the 3-day session, each Chiksan department made a presentation designed to give the sales force a better idea of the complex workings of a growing organization. The meetings were conducted by R. T. Jones, western regional sales manager, and L. J. Smith, eastern regional sales manager.

Gathered at Chiksan Co.'s home office for a 3-day sales conference were: Front row: Jack Runnels, Chiksan of Canada, Edmonton; Joe Schlarb, southern California; L. J. Smith, eastern regional sales manager, Brea, Calif.; G. R. Winder, vice president and general sales manager, Brea; R. T. Jones, western regional sales manager, Brea; Bill Clark, Chicago; C. E. Thomas and Jack Powers, Newark. In the second row are: Frank Wiegand, southern California; Bill Brien, Weco Division, Houston; Monk Cook, southern California; Al Plomp, Chiksan of Canada, Calgary; Howard Dickson, southern California; Lee Guill, Chicago; Chuck Holcomb, Weco Division, Houston; Bev Ragsdale, Chicago; Hal Stock, Oakland, Calif.; and Art Edwards, southern California.



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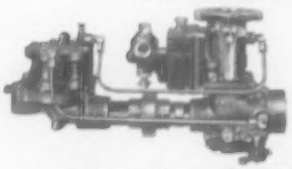

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the Abilene store since joining Oilwell in 1951.

Mitchell was employed by Oilwell at Albany in 1948.

T. D. Williamson Names California Representative

The appointment of Alfred Kent of Alfred Kent & Son as its new California representative has been announced by T. D. Williamson, Inc., manufacturer of specialized equipment for pipeline maintenance and construction.

Kent is fully qualified for this position. He has been associated for many years with the refinery, natural gas, and pipeline industries in the distribution of mechanical equipment throughout the Mid-Continent and Gulf Coast areas. He is a graduate engineer of Mississippi State College with a B.S. in mechanical engineering. Prior to his appointment by T. D. Williamson, Inc., Kent was a long-time Houston resident.

Waukesha Sales Opens Parts Depot at Sherman

Waukesha Sales & Service, Inc., distributor in Texas for Waukesha engines, has announced the opening of a parts depot at Sherman, Tex. The depot will serve Waukesha drilling engines in the Sherman and Whitesboro areas in Grayson and Cooke counties with improved field-repair facilities.

This shop truck includes all necessary Waukesha special tools: telescoping poles with hoists; electric generator for power wrenches, grinder, drills, hones, and seat facers; oxygen and acetylene equipment; and vise, pullers, precision instruments, and analyzers. Charles W. Noe, senior North Texas Waukesha field mechanic, is the local representative. The depot is under supervision of S. W. Wacey, division office manager at Wichita Falls.

Wheland Opens Parts Depot at Oklahoma City

To provide better service for oil-field customers, The Wheland Co. has opened this parts depot at Oklahoma City, Okla. The depot is staffed by men who are thoroughly familiar with the operation, maintenance, and repair of all Wheland equipment. W. E. Shorts and O. L. O'Shields are in charge.

Visco Advances Jacks and Kirkpatrick to Veeps

The advancement of D. M. Jacks and Dr. W. H. Kirkpatrick to vice presidents has recently been announced by F. H. Thorne, president of Visco Products Co., Inc., Houston.

Formerly assistant vice presidents of the oil-treatments firm, both will continue in their present capacities. Jacks is sales manager and Kirkpatrick is technical director. Visco manufactures crude-oil emulsion breakers and corrosion inhibitors in plants at Sugar Land, Tex., and Anaheim, Calif.

Happy Co. Assigns Harold Ashworth to Seminole Area

Harold R. Ashworth, salesman for northern Oklahoma with headquarters in Tulsa, has been assigned to Seminole, Okla., as district manager for Happy Co., manufacturers and distributors of oil-field equipment and accessories.

H. R. ASHWORTH

R. B. RUNDLE

He replaces R. B. (Cotton) Rundle, who has been promoted to city salesman in the Tulsa area.

Dicalite Observes 25th Anniversary

April began Dicalite's twenty-fifth anniversary year, according to an announcement by D. Loring Marlett, vice president and general manager of Dicalite Division, Great Lakes Carbon Corp. On April 1, 1930, the newly formed Dicalite Co. made the initial carload shipment from its first plant at Walteria, Calif.

During Dicalite's 25 years of operation, over 50,000,000 bags of diatomite products have been produced and shipped to industrial users all over the world. Edward A. Harris is operations manager of the division's two plants in California, and one each in Oregon and Nevada. The sales engineering organization is headed by Joseph E. Moran, general sales manager. The division has its own laboratories for sales service, quality control, and product development under the management of Dr. Paul W. Leppla, technical director.

Great Lakes Carbon Corp. acquired Dicalite in 1944, and merged it into its organization as the Dicalite Division. Additional deposits at Lompoc, Calif., and a third deposit and plant at Basalt, Nev., were added. In 1952, Great Lakes Carbon Corp. completed building and put into operation the fourth Dicalite plant at Lompoc, Calif.

This Dicalite plant at Lompoc, Calif., is the most complete diatomite processing plant erected in the past 25 years. The newest of the Dicalite Division's four plants, it was put into operation in 1952.

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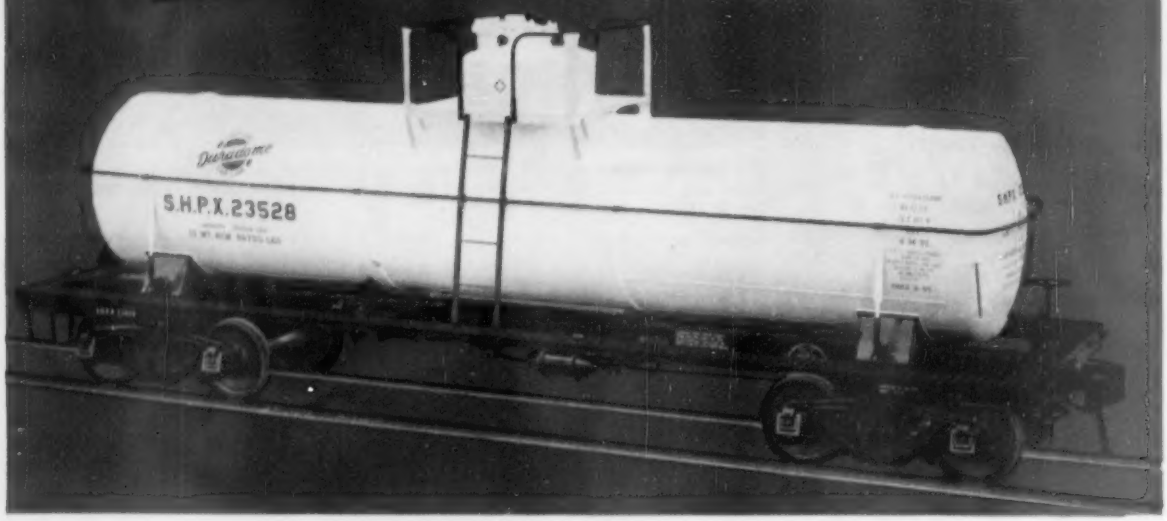

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CITY ..... ZONE NO. ..... STATE .....
NAME ..... TITLE .....
This card void after 90 days.

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BUSINESS REPLY CARD
First Class Permit No. 3, Tulsa, Oklahoma

THE OIL AND GAS JOURNAL
P. O. BOX 1260
TULSA, OKLAHOMA

2

To The Oil and Gas Journal:
I would like to receive details on products advertised in your issue of May 30, 1955

Page ____ By ____	Page ____ By ____
Page ____ By ____	Page ____ By ____
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3

To The Oil and Gas Journal
I would like to receive details on products advertised in your issue of May 30, 1955

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The cards shown here are supplied for your convenience. If you want additional information on any product advertised in this issue, just fill in the page number and the advertiser's name, add your own company name and address, tear off the card, and drop it in the outgoing mail.

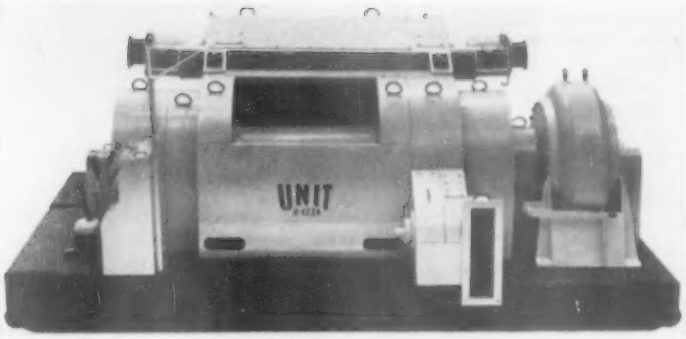
We'll get it for you

(No postage required)

... What's New in Equipment?

Use the handy Time-Saver Cards ✓✓✓ to obtain additional information on these items

by Dan B. Miller



Unit Draw Works Made for Deep Drilling

The Model U-1220 draw works, rated at 1,200 to 2,000 hp., is designed for heaviest loads and deepest drilling.

The U-1220 features a large drum (32¼-in-diameter barrel by 57 in. long) and brakes (60-in. diameter by 10 in.), identical drum clutches (42 by 12 Airflex, both with positive locks), and a high degree of parts interchangeability throughout the rig. The rig is framed in two sections, each less than 8 ft. wide. The front section contains the drum, rotary shaft, controls, and auxiliary brake. The rear section contains the three-speed transmission, catheads shaft, and optional sand reel, if required.

The three forward drives and the sliding-gear reverse in the transmission combine with the two drum drives to give six forward and two reverse speeds at the drum. One reverse and three forward speeds are available at the rotary, catheads, and optional sand reel. All hoisting drives use 1¾-in.-pitch quadruple chain. The rotary and cathead drives use 1¾-in.-pitch double chain.

The U-1220 drum shaft has an 8.662-in. diameter at the bearings, which are on 80-in. centers. Both transmission shafts are 6.693-in. diameter at the bearings, which are on 69½-in. centers. This combination of large shafts, large bearings, and short bearing center distances is indicative of strength and a long life of trouble-free operation.

Special attention in the design of the U-1220 was given to its application to barge and offshore drilling operations. Corrosion problems are held to a minimum by the special plating on all adjusting linkage and exposed hardware. *Unit Rig & Manufacturing Co.*

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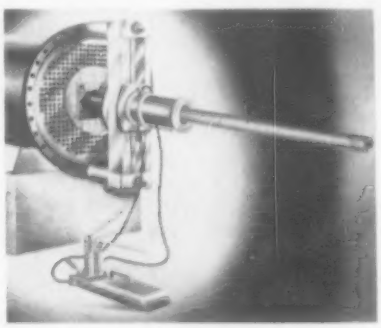


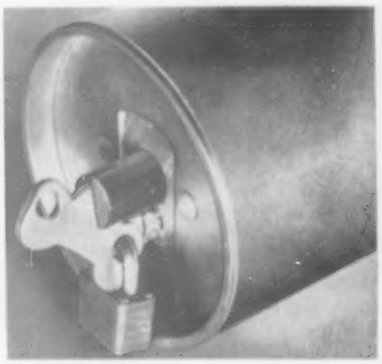
Hydro-Ejector Facilitates Tube-Bundle Removal

In removing and replacing heat-exchanger-bundle tubes, the need for jerry-built rigging and pulling beams is eliminated by a new hydraulic handling device which can be operated by only two men to push a bundle 8 ft. in less than 25 minutes.

So accurate is the alignment of this hydroejector that even the largest bundles will not stick when moved rapidly with the 12,000-lb. force which can be exerted by the device. Since the ejector is attached directly to the exchanger shell, no temporary steel structures are required to withstand the powerful thrust. None of the removal force is transferred to the exchanger supports.

This hydroejector is available as a complete packaged unit, including the pump, hose, adjustable yoke, ram, tie rods, cable, and all other necessary equipment. *The M. W. Kellogg Co.*

Check No. 2 On The Time-Saver Card



New Cap Closes, Locks Unattended Pipelines

This new cap closes and locks the ends of pipelines while workmen are away. The cap lock is held firmly onto the end of the pipe by a pair of expanding elbows which screw out to lock tightly against two opposite inside walls of the pipe. To insure that the unit is not manipulated loose, a lock can be applied to prevent movement of the holding mechanism.

Caps for the line-pipe lock will be furnished in from 4 to 12-in. diameter, and on special order in sizes up to 24 in. One lock unit, with various sizes of caps, can be used on several sizes of pipe.

Preliminary orders indicate heavy demand in areas where natives frequently throw large boulders into lines during construction, necessitating expensive repairs and debris removal. Use

of the locking caps may be mandatory in some areas where law prohibits leaving open-ended pipes untended. *B. J. Stansbury.*

Check No. 3 On The Time-Saver Card

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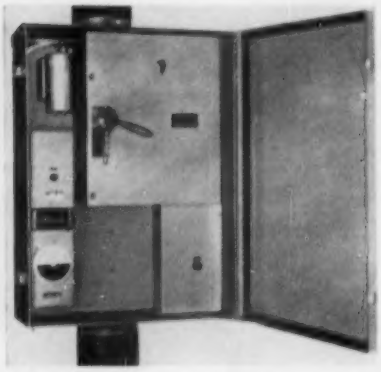


Oil-Field Motor Starter Has Plug-In Components

A new oil-well pumping control unit incorporates exclusive features such as a plug-in time switch, plug-in undervoltage relay, plug-in undervoltage relay with sequence starting, plug-in start-stop push-button station, and space for a meter socket or test device.

The unit has been made as dusttight and moistureproof as possible through the use of a Neoprene gasketed door. It also includes every known safety feature. The separate ventilated compartment for the overload relays prevents tripping due to heat build-up.

By using the various plug-in devices a basic unit can be made to serve many purposes. Since no rewiring is required the unit is also easily changed by the pumper in the field from one duty to another. It can also be easily moved from one location to another. *Nelson Electric Manufacturing Co.*

Check No. 4 On The Time-Saver Card

●

Three Centrifugal Pumps Made for Oil-Field Service

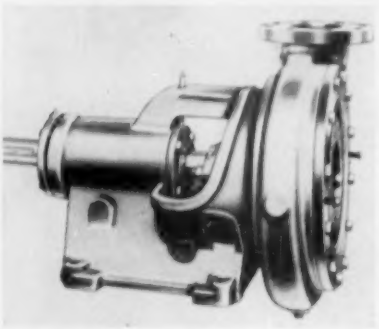
Three new centrifugal pumps are designed for rugged oil-field service. The line includes new washdown and brake-cooling pumps, mud-processing and supercharging pumps, and a pneumatic sponge pump.

All pumps utilize the case and impeller design that allows higher pressures to be delivered with lower power requirements. The semiopen impeller is constructed of heavy cast iron to provide the extra strength needed for high-capacity operation.

The mud-processing and supercharging pumps are designed to increase the efficiency and capacity of slush pumps or to eliminate the use of high-pressure reciprocating mud pumps. When used to process mud, they will handle a large volume of mud through the hopper while maintaining complete agitation. For supercharging slush pumps, the pump boosts circulating capacity by keeping a positive pressure on the suction end. This action produces the higher bottom-hole pressures required in jet drilling.

A medium-capacity pump, which has a rating of 1,000 g.p.m. at a pressure of 37 psi., and a high-capacity pump, which will handle 1,200 g.p.m. at 50 psi., are now available.

The washdown and brake-cooling pumps are designed to be driven by belt or by direct coupling at speeds up



to 2,800 r.p.m. They are available in clockwise or counterclockwise rotation. The pumps may be driven from the power takeoff and are operating at desired speed when the engine is at normal drilling speed. The medium-duty model is rated at a capacity of 120 g.p.m at a pressure of 90 psi. while operating at 2,800 r.p.m. A heavy-duty model has a capacity of 270 g.p.m. at a pressure of 130 psi. while operating at 2,700 r.p.m. *Byron Jackson Co.*

Check No. 5 On The Time-Saver Card

●

Process Refractometer Monitors Continuously

The process refractometer is one of four plant-type analytical instruments acquired by Consolidated Engineering Corp. from Phillips Petroleum Co. It is designed to monitor continuously the refractive index of liquid process streams. Among its uses have been automatic control of liquid-stream

blending and fractionating-tower operation.

The refractometer measures the difference in refractive index between a sealed-in liquid standard and a flowing sample drawn directly from a process line. This measurement is based on the bending effect caused by passing a ray of light from one medium to another of different refractive index. Beam deflection is proportional to refractive-index difference and is readily measured by an optical servo system. A telemetering circuit for strip or circular-chart recording, or direct control, is provided by a potentiometer geared to the servo motor shaft.

Thoroughly field-proved in Phillips' refineries, this instrument is simple and compact. The refractometer is housed in a single explosionproof bell mount designed for outside use near the sample point. *Consolidated Engineering Corp.*

Check No. 6 On The Time-Saver Card

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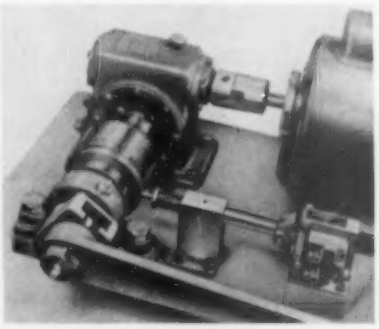


Uni-Feeder Pumps One To Seventy-Two Slugs

Uni-Feeder, a single-revolution, clutch-operated proportioning pump offers a broad field of application. Uni-Feeder pumps are standard pumps equipped with a solenoid or air-cylin-

"We drilled more than fifty miles of hole... with no failures with REED Super Shrink-Grip TOOL JOINTS"

THE NOAH PETROLEUM COMPANY
CITIZENS NATIONAL BANK BUILDING
ALBION, ILLINOIS

January 31, 1955

Mr. W. L. Childs, Jr.
General Sales Manager
Reed Roller Bit Company
Houston 1, Texas

Dear Mr. Childs:

I thought you might be interested in the exceptional performance records of your Reed Super Shrink-Grip Tool Joints.

We drilled more than fifty miles of hole...with no failures...with Reed Super Shrink-Grip Tool Joints.

We drilled 102 holes for a total of 266,420 feet with [illegible] strings of 4 1/2" 16.60 lb. drill pipe each with [illegible] Reed 4 1/2" O.D. API Full Hole Super Shrink-Grip Tool Joints.

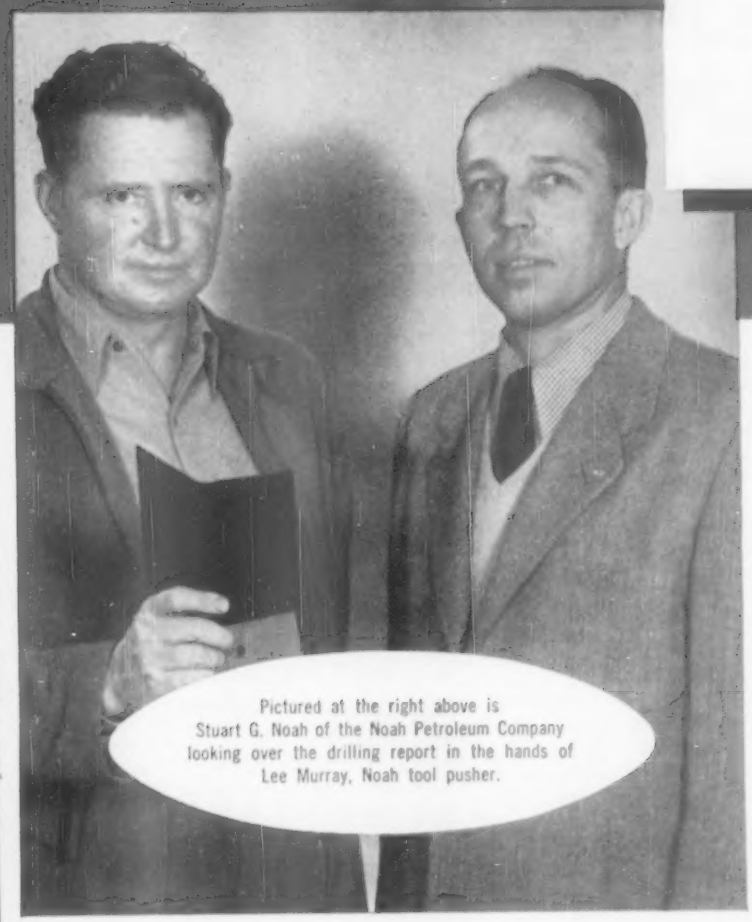
We had no fishing jobs or other tool joint trouble of any kind. All of this drilling has been in the Illinois Basin where the formations are very abrasive and the average life of 4 1/2" drill pipe is about 100,000 feet, with the life of the tool joints averaging 50,000 feet.

The above information on Reed Tool Joints is typical. That's why we have been a long-time 100% Reed Tool Joint user.

Stuart G. Noah

SGNia

Stuart G. Noah



Pictured at the right above is Stuart G. Noah of the Noah Petroleum Company looking over the drilling report in the hands of Lee Murray, Noah tool pusher.

LEADING OPERATORS THROUGHOUT THE OIL WORLD REGULARLY TELL US THAT REED TOOL JOINTS LAST LONGER

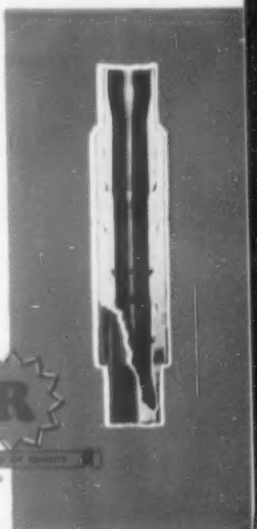
and are the SAFEST MONEY CAN BUY

Reed's advanced design, modern metallurgy, precision machining and 120 inspections throughout the manufacturing process . . . assure the continuance of the uniform high quality that has made Reed Tool Joints the standard of comparison.

• • •

We can furnish you any type of pipe connection you desire: flash welded to the pipe . . . counterbore welded to the pipe . . . hand applied to the pipe.

See a Reed representative . . . or write to the company . . . for detailed information as to why REED TOOL JOINTS LAST LONGER.



REED ROLLER BIT COMPANY HOUSTON 1, TEXAS

Gulf Coast, Mid-Continent, Rocky Mountain and Canadian Distributor for Martin-Decker Products

der-operated single-revolution clutch. In a normal position this clutch is disengaged. The motor and gear are always running.

When the solenoid or air cylinder is energized, the clutch becomes engaged. This allows the pump to go through one complete cycle for which its accurate capacity has been previously adjusted to provide the exact slug of fluid desired.

Energizing of the solenoid or air cylinder is by electrical contacts or by air-sending devices in the bulk line. It may be controlled according to a time cycle, flow, pH, color, concentration, or any other meterable factor. Uni-Feeder pumps are available with minimum capacities from 0.000093 gal. to maximum capacities of 27 g.p.m. *Philadelphia Pump & Machinery Co.*

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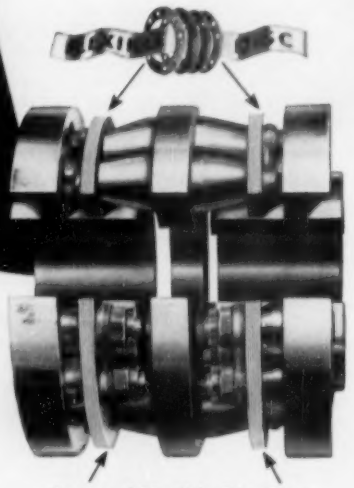
Specify THOMAS ALL METAL FLEXIBLE COUPLINGS for Power Transmission to avoid Costly Shut-Downs



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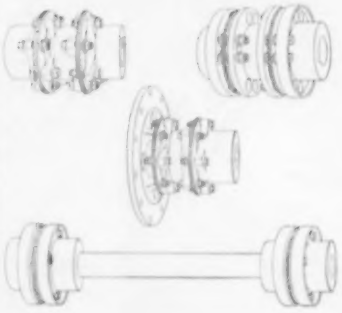
You can use Thomas Couplings to your advantage on Pumps, Compressors, Cooling Towers, Rigs or any other tough job where continuous operation and dependability are required. Thomas Couplings can be assembled or disassembled without disturbing the connected machines, except in rare instances.

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes.



DISTINCTIVE ADVANTAGES

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.

Write for our new Engineering Catalog No. 51A

THOMAS FLEXIBLE COUPLING COMPANY

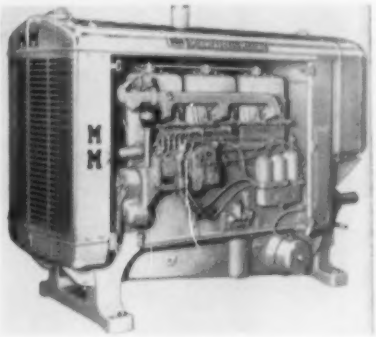
Largest Exclusive Coupling Manufacturer in the World

WARREN, PENNSYLVANIA, U.S.A.

New Diesel Power Unit Has Water-Jacketed Base Pan

A new 105-hp. diesel-power unit has a water-jacketed base pan. Termed the D605-6A, the new power unit is of heavy-duty industrial design with six cylinders. Bore is 4⅝ in. and stroke is 6 in. Piston displacement is 605 cu. in.

The thermoclad construction of the base pan provides a completely coolant-jacketed pan through which coolant circulates continuously. Uniform operating temperature from the cylinder heads to the bottom of the base pan is maintained.



A uniform warmup occurs in the D605-6A with this coolant circulation system since the bypass routes the warming coolant only through the engine until a predetermined temperature is reached. Then the thermostat opens and gradually allows heated coolant to circulate through the radiator.

Oil temperature is also held at correct operating degree, regardless of load or atmospheric temperature, without use of any auxiliary heat-exchanger equipment. The thermoclad channels in the base pan facilitate quick warmup of the crankcase, and hold its temperature steady above the dew point of the crankcase gases. *Minneapolis-Moline Co.*

Check No. 8 On The Time-Saver Card

●

New Cracking Catalyst Has High Pore Volume

A new cracking catalyst of high pore volume for the petroleum refining industry brings about increased stability and cracking efficiency.

By combining a higher pore volume, the most effective pore diameter, the best control of particle-size distribution, and an efficient degree of hardness, this new catalyst achieves the stability which makes possible the highest production yield of octane. Another characteristic of this catalyst is its achievement of proper particle-size distribution. *American Cyanamid Co.*

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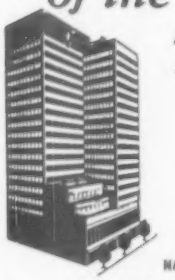
directed by
OIL MEN . . .
in the
OIL CAPITAL
of the World!



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- Brochures

for your copy, check ✓ ✓ the Time-Saver Cards.

Blue Streak Power for Gas Compressors, a 12-page bulletin, No. SA-611, describes Climax Blue Streak power units for gas compressors. The bulletin gives detailed information on Climax models K-67, K-75, V-80, V-85, V-122, and V-125. Climax Blue Streak K and V-Series engines are ideal for compressor-drive service because of their rugged dependability. Complete specifications and dimensional drawings of all six types of engines are included. *Climax Engine & Pump Manufacturing Co.*

Check No. 10 On The Time-Saver Card

•

Ingersoll-Rand Motorpumps. A new 24-page bulletin covers the entire line of close-coupled Motorpumps from ¼ to 75-hp. sizes for delivery of 5 to 2,800 g.p.m. The bulletin, Form 7093, is designed to make it easy to select the correct size and model. A visual and concise index shows the basic classifications of pumps covered with their specifications. The next three pages highlight the advantages of the Motorpump and point up its design features. On the following pages each class of pump is explained and illustrated in detail. *Ingersoll-Rand Co.*

Check No. 11 On The Time-Saver Card

•

Gas and Plunger-Lift Equipment. An eight-page, fully illustrated catalog on gas lift and plunger lift equipment is clearly illustrated with large photographs and schematic drawings. It contains complete descriptive material, including prices on gas-lift valves, surface controllers, and plunger lifts. *McMurry-Brown Co.*

Check No. 12 On The Time-Saver Card

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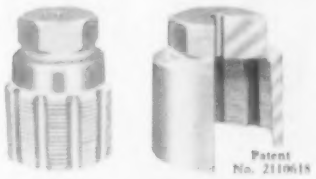
Controller Bulletin. New 12-page bulletin, 5A-13 describes in detail the company's new Model 41A pneumatic-indicating controller which replaces the earlier Model 41 for control of process variables such as temperature, pressure, liquid level, and humidity. New design features are fully explained, with emphasis on the longer, more readable

TUBING
Cleanout
TAP *and* DIES
by Baird



2" to 4" Plain and Eue Round and V-Thread

For field use in cleaning up smashed threads, removal of dirt and contamination on collar or tubing. The tap end is relieved at each land to assist in removal of gyp.

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To design new oil-refineries and chemical plants. Please send your resume to our Personnel Department. Your letter will receive immediate and confidential attention.

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4½ MILLION BARRELS METERED*

IN CONTINUOUS 24-HOUR SERVICE
—WITH NO MAINTENANCE AND
—LESS THAN $25 FOR MINOR
REPLACEMENTS

*An actual pipeline operating record where Brodie Model B-72D Meter was inspected after metering 189,000,000 gallons of gasoline and heating oil.

and here's why:

- Large rotor bearings are designed for long enduring service
- Double case construction prevents distortion of measuring element
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Field operating records prove Brodie BiRotor Meters' long service performance with low maintenance and high sustained accuracy. For crude or finished product lines, gathering systems and product blending, why not avail yourself of Brodie's specialized metering experience?

ALL-STEEL BiRotor TRUE-ROTARY

BRODIE METERS

RALPH N. BRODIE COMPANY · San Leandro, California, U.S.A.

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indicating scale, extensive use of high-quality control components, and simplified maintenance. Separate sections are devoted to temperature and pressure-measuring systems, with information on the filled thermal systems available, temperature bulbs and accessories, new pressure elements, pressure seals, and control valves. *Foxboro Co.*

Check No. 13 On The Time-Saver Card

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Centrifugal Compressors for Natural-Gas Transmission, Bulletin No. C-1100-B57, has been issued by Worthington Corp. A two-page diagram is used to illustrate 13 major design features of a centrifugal compressor with center-line support. An outline drawing is also presented along with information on the lubricating and sealing system. *Worthington Corp.*

Check No. 14 On The Time-Saver Card

●

Industrial Safety Equipment. This new, easy-to-read, fully illustrated catalog is designed as a workable, every-day, safety manual. The catalog is divided into four major sections: eye protection; head protection; respiratory protection; and welding. Illustrations, descriptions, and ordering information have been correlated for simplicity and practicality. *Willson Products, Inc.*

Check No. 15 On The Time-Saver Card

●

Klemp Metal Grating, a 16-page data and specification manual covering all types of grating, open-steel floor armor, stair treads, vessel liners, bridge decking, and drain grates, is believed to be the most technical book of its type ever developed in the grating industry. The publication contains safe-load tables for: (1) basic types of gratings; (2) panel-width constant charts; (3) tables on standard widths and types of steel stair treads most frequently used; (4) types of anchors used for grating; (5) use of grating and its allied products in industry and the oil and chemical fields; and (6) various types of drain grates. *Klemp Metal Grating Corp.*

Check No. 16 On The Time-Saver Card

●

New Oil-Field Catalog and Ton-Mile Calculator. A new 64-page catalog describes the correct use of wire rope in rotary drilling and cable-tool drilling. The catalog contains extensive data and tabular material of interest to all users of wire rope. Also included is a chapter on field troubles and their causes. The Ton-Mile Calculator is a slide chart which easily figures ton miles for all standard drill-pipe sizes. *Wire Rope Corp. of America, Inc.*

Check No. 17 On The Time-Saver Card

●

Measuring and Controlling Liquid Level. Bulletin 1161 includes a discussion of the basic principles of liquid-level measurement, control, and transmission. Systems are described in detail along with the applications, principles of operation, limitations, and advantages of each. *Industrial Division, Minneapolis-Honeywell Regulator Co.*

Check No. 18 On The Time-Saver Card

●

Model C-3 "Electrifugal" Pump Bulletin. Model C-3 supporting adapter Electrifugal pumps are described in a new bulletin, 52B6083C. The units are available in capacities to 2,500 g.p.m., with heads to 400 ft. and temperatures to 250° F. Pump types described include those having a casing with removable suction cover and those having a casing with suction and discharge nozzles in one piece. *Allis-Chalmers Manufacturing Co.*

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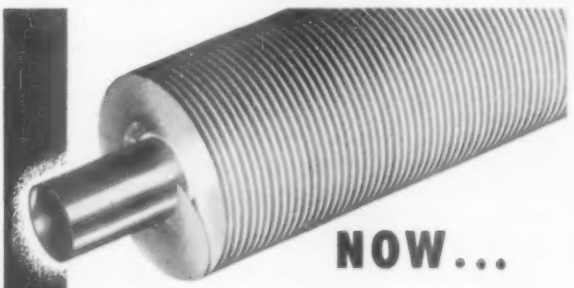

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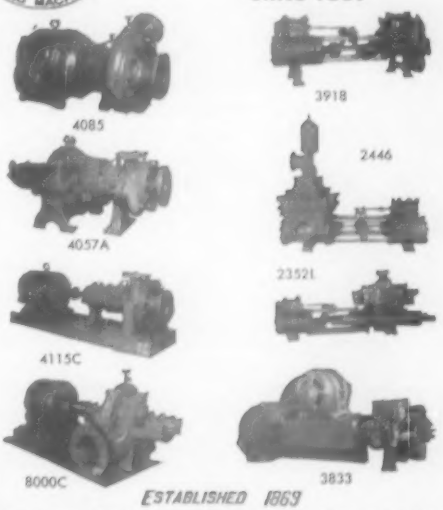

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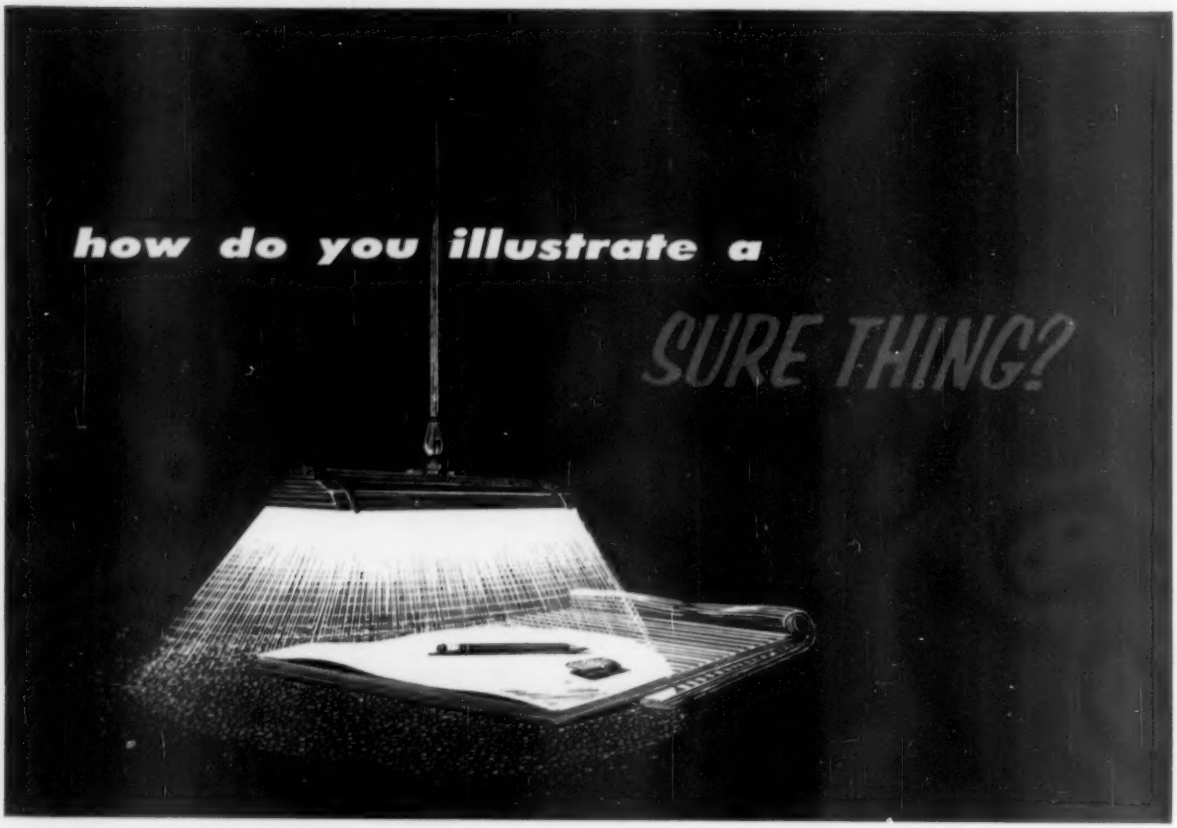

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EXPLORATION

Permian Basin Rewards Rechecking Efforts With Dozen Big Discoveries

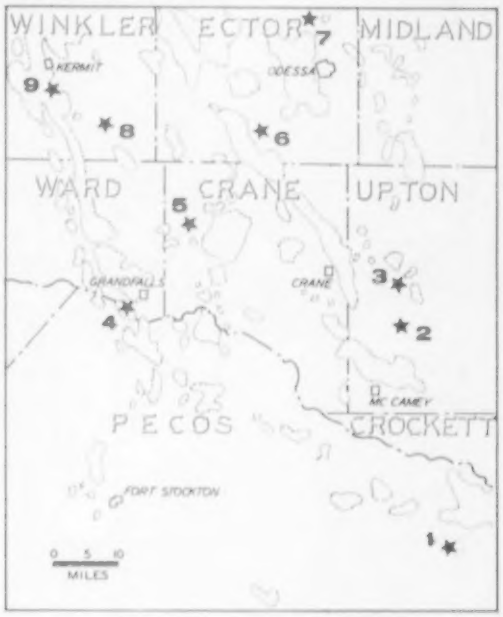
by Carl Hoot

LONG-RANGE outlook in the Permian basin area of West Texas is still slanted toward deep exploration. The rechecking of old producing fields for the possibility of overlooked pre-Permian structures has paid off in at least 12 big discoveries so far this year.

All of these lie along the trend of Central Basin platform fields. Ellenburger, Devonian, and Strawn have been the principal objectives. The search for new oil has not been concentrated on the western side entirely. Exploration drilling has added new fields, new pays, and important extensions in southern Tom Green and in northern Schleicher counties. Strawn discoveries and extensions have been numerous in western Runnels and throughout Coke County. Reworking also brought in new pays and converted dry holes into producing wells. Surveys and tests in a failure 2 miles northeast of Winters accounted for an 818-bbl. Gardner (local for Strawn) discovery. This well was Thompson-Powell-Derrick Drilling Co. 1 Kendricks.

Gaines County strikes . . . Lack of space prevents including Gaines County on the accompanying map, which had three important Devonian discoveries. These were Humble 1 Riley, west of Seminole field; Honolulu Oil 1 O'Daniel, Devonian opener in Wescott-Strawn field; and Husky Oil 1 Webb, Devonian strike in extreme northern Gaines County. Other pre-Permian discoveries on the western side of the basin are:

1. Pecos County, Ellenburger. No. 1 Canon was drilled by Standard of Texas, as operator, with Phillips Petroleum, Sohio Petroleum, and Fuhrman Petroleum contributing. Potential was 517 bbl. from pay at 9,800 ft. This well is considered outside the Central Basin platform and is separated from the platform fields by dry Permian and Ellenburger tests. Top of the Ellenburger in 1 Canon is 130 ft. higher than an Ellenburger failure 1½ miles northwest, in Sheffield pool.



Stars on the map are part of pre-Permian discoveries completed this year.

2. Upton County, Ellenburger. Humble 1-D Rosa Barnett, geologically within the Midland basin, is an example of thorough testing and interpretation. Water was found in the top of the Ellenburger, and completion, for 1,615 bbl., was made from the lower section.

3. Upton County, Strawn discovery. Williamson and Roden 1 Windham flowed heavily from the Strawn, but is projected to the Ellenburger. Location is west of Strawn oil in Amacker-Tippett field, and 4 miles from the Ellenburger discovery in that field.

4. Ward County, Ellenburger. Cities Service Oil Co. 1-B Brandenburg extended Devonian production and established Ellenburger gas-distillate pay on the east side of Payton field. Pay was at 10,086 ft. and the Ellenburger potential was 633 bbl. of distillate and 12,500 M.c.f. of gas.

5. Crane County, Ellenburger. Gulf Oil Corp. originally started 244-Waddell as a north extension attempt to its Waddell (middle Simpson) discovery of Block 21 field. The test had gas only in the Waddell, then drilled ahead to make an 894-bbl. Ellenburger well at 6,239 ft. Regular field pay is at 6,030 ft. Additional field tests, by Gulf, have since been rescheduled to the Ellenburger as the main objective.

6. Ector County, Ellenburger. Humble 1-B York, east of Penwell field, flowed 452 bbl. of oil at 12,395 ft. Established Ellenburger production is 5 miles to the northeast at South Cowden, and 5 miles to the southwest at Jordan field.

7. Ector County, Ellenburger. Humble 1 Barrow, not completed at this writing, had 50 ft. of pay section indicated and had made several heavy flows of oil. It is likely that this well is on the same structure as Texaco's Ratliff discovery, 2 miles to the east. Both wells are structurally flat on the Ellenburger.

8. Winkler County, Devonian, possible Ellenburger. Stanolind 20 Sealy Smith, twin to a Glorieta well in North Monahans field, indicated a thick Devonian section and had recovered oil from the Ellenburger. It was still testing at this writing. Devonian top at 9,450 ft., minus 6,671 ft., is 1,300 ft. higher than a dry hole 2 miles to the east.

9. Winkler County, Devonian discovery and Ellenburger extension. Stanolind 7-A Cowden, south of Kermit and on the eastern flank of Emperor field, flowed 65,000 M.c.f. of gas from the Devonian and 140,000 M.c.f. from the Ellenburger.

West Texas exploration seems to go by trends, or phases, and the present deep play by large operators shows no signs of letting up over the remainder of this year.

APRIL SHOWERS SUCCESSES

Canada Looks to the North

1. First substantial gas flow in the Northwest Territories turned Canadian exploration eyes to the wild MacKenzieland area. A calculated open-flow potential of about 17,000 M.c.f. per day was reported at Briggs 1 Rabbit Lake, 50 miles southwest of Fort Providence. Production is from Devonian lime.

Far-Flung Texas Exploration

2. Production reopened in Val Verde basin; first oil in Maverick County.

3. First production for Hemphill County, Texas Panhandle.

4. Biggest Panhandle gas-distillate well to date.

5. Third pay indicated at Laketon-Delp field in Gray County.

6. Rapid development assured new Strawn field in Sterling County.

7. Number five for Texas offshore exploration.

8. New Mexico well equals Texas producing-depth record.

Mississippi Delta—Center of Louisiana Maritime Operations

9. Maritime work in and around Plaquemines' delta area resulted in four new fields.

10. Record depth of salt penetrated at Cote Blanche.

Lower Cretaceous Growing in Mississippi Importance

11. Rank discovery in Copiah County.

12. Deep-pay discovery at Pistol Ridge.

Oklahoma, Pennsylvanian and Ordovician Success

13. Fort Scott production opened in Panhandle.

14. Kansas City lime new pay for Panhandle.

15. One of country's most active areas is the Lindsay-Bradley district.

Rocky Mountain, from Montana Plains to San Juan

16. Tripay discovery at Gas City Unit.

17. New pay at Northwest Sumatra.

18. Big Horn receives second Muddy sand producer.

19. San Juan basin busy.

They're Going Deep in California

20. Deep wildcatting turns up nearly all of state's new top-grade crude reserves.

Discoveries From Mackenzie . . . to the Rio Grande

by John C. McCaslin

SPRING exploration met with outstanding success in far-reaching inland and offshore areas in April. Near-arctic, sand-country, tidal-marsh, and rolling-plains wildcatting stretched the month's success map to the tearing point . . . from the MacKenzie River to the desolate Val Verde basin, and from the Louisiana salt-water marshes to Coalinga.

From Sonora to Gulf waters . . . The most significant wildcat find in Texas was at a Val Verde County wildcat on the wild western flank of the Edwards Plateau.

Phillips Petroleum Co. revived production in the small Val Verde basin (an extreme southeastern extension of the Midland basin) at 1-A Cauthorn, 5 miles southwest of previous gas production in the Vinegarrone area. The Strawn-Pennsylvanian discovery had an open flow of 42,000 M.c.f. of gas per day with 1 bbl. per million condensate recovery. This test is the second producer for the county. The Vinegarrone area was opened in 1951 but has had no production since 1953. Humble has a wildcat under way 1 mile south of the Phillips strike, due to drill to 13,000 ft.

. . . First oil in Maverick. Continental Oil Co. opened first oil production in Maverick County in the upper reaches of the Rio Grande embayment. The 1 Chittim on the Chittim anticline flowed at the rate of 157 bbl. of oil per day. This flow was based on a 13-hour test with production from open hole at 3,109-4,134 ft. in the Austin chalk (Upper Cretaceous). The new field is 18 miles east of Eagle Pass.

. . . Hemphill joins flock. Up in the Texas Panhandle Sun Oil Co. opened first production in Hemphill County at 1 Dale Nix, 2½ miles northwest of Canadian and 23 miles southeast of nearest production.

The well made a calculated potential flow of 149 bbl. of 50.8°-gravity oil per day from perforations in the Cherokee-Des Moines Pennsylvanian at 9,615-9,794 ft. Sun is drilling another test 2 miles northwest of the 1 Nix.

. . . More Panhandle success. The Sharples Oil Corp.-Baker & Taylor Drilling Co. 1 Boyd in Hansford County had a calculated absolute open flow of 109,000 M.c.f. of gas per day

Total April Completions, Exploration and Development

	Total completions					Total wildcat wells					Active
	Total	Oil	Gas	Dry	Footage	Total	Oil	Gas	Dry	Footage	operations
Alabama	6	0	0	6	33,474	5	0	0	5	29,821	3
Arkansas	91	44	0	47	269,878	32	4	0	28	90,767	60
California	249	192	5	52	1,229,198	37	3	1	33	233,935	249
Colorado	138	38	5	95	745,684	82	6	2	74	437,369	118
Florida	1	0	0	1	4,275	1	0	0	1	4,275	4
Illinois	340	173	1	166	804,026	89	10	1	78	173,836	436
Indiana	63	20	2	41	102,790	31	3	0	28	47,336	73
Kansas	467	216	47	204	1,678,290	87	9	5	73	355,835	462
Kentucky	113	40	20	53	192,945	15	1	3	11	22,816	165
Louisiana	317	222	14	81	1,939,265	51	20	1	30	511,733	458
North	173	134	6	33	496,145	14	3	0	11	90,843	170
South	144	88	8	48	1,443,120	37	17	1	19	420,890	288
Michigan	30	12	0	18	88,582	15	2	0	13	41,509	127
Mississippi	39	19	0	20	296,785	10	2	0	8	78,478	48
Montana	13	5	0	8	77,533	5	0	0	5	37,996	56
Nebraska	70	32	2	36	385,761	23	7	0	16	116,359	51
New Mexico	131	81	31	19	608,073	18	4	3	11	111,962	128
Northwest	34	0	28	6	115,077	6	0	3	3	17,351	26
Southeast	97	81	3	13	492,996	12	4	0	8	94,611	102
New York	*120	54	0	66	169,280	0	0	0	0	0	18
North Dakota	24	17	0	7	184,535	5	0	0	5	38,100	27
Ohio	84	33	23	28	183,657	2	0	0	2	6,808	195
Oklahoma	798	483	40	275	2,383,621	73	12	3	58	257,081	1,159
Pennsylvania	65	25	14	26	126,987	0	0	0	0	0	61
South Dakota	3	0	0	3	22,841	3	0	0	3	22,841	3
Texas	1,668	1,034	54	580	7,363,311	449	93	13	343	2,265,928	1,278
North Central (7-B & 9)	551	329	2	220	1,662,250	154	34	1	119	548,052	351
West (7-C & 8)	459	334	6	119	2,527,731	100	17	2	81	614,674	371
Panhandle (10)	72	57	11	4	257,292	4	2	1	1	30,661	53
East (5 & 6)	59	23	6	30	316,394	26	4	0	22	148,754	87
Gulf Coast (2 & 3)	237	126	19	92	1,498,348	71	23	4	44	498,677	201
Southwest (1 & 4)	290	165	10	115	1,101,296	94	13	5	76	425,110	215
Utah	10	0	0	10	54,024	9	0	0	9	52,649	39
West Virginia	37	7	21	9	90,372	1	0	0	1	4,056	159
Wyoming	59	39	1	19	292,458	13	2	1	10	85,705	135
Miscellaneous	**6	1	0	5	16,286	4	0	0	4	7,274	¶5
Total April 1955	4,942	‡2,787	280	†1,875	19,343,931	1,060	§178	33	849	5,034,469	5,517
Total March 1955	4,688	2,738	264	1,686	18,623,102	965	146	34	785	4,658,612	5,222
Cumulative 1955	18,045	10,351	1,032	6,662	72,236,160	3,816	594	118	3,104	18,365,101	
Cumulative 1954	17,362	9,817	1,202	6,343	71,456,847	3,462	508	103	2,851	16,925,120	
Western Canada	132	87	6	39	604,387	41	4	5	32	237,132	
Alberta	60	38	3	19	366,532	19	2	2	15	143,465	
Saskatchewan	55	40	1	14	189,249	17	2	1	14	68,821	
Manitoba	13	9	0	4	30,600	1	0	0	1	6,840	
B.C.-N.W.T.	4	0	2	2	18,006	4	0	2	2	18,006	
Cumulative	759	532	39	188	3,396,027	218	44	22	152	1,149,597	

*N. Y. figure incl. winter backlog. †Incl. 112 service wells: Calif. 2, Kans. 1, N. Y. 66, Ohio 1, Okla. 17, Pa. 24, Tex. (Dist. 4) 1. ‡Incl. 77 cond. wells: N. La. 1, S. La. 19, Miss. 6, N. Tex. 1, W. Tex. 1, Tex. Panhandle 5, E. Tex. 3, Tex. Gulf Coast 22, S.W. Tex. 15, Okla. 4. §Incl. 33 cond. strikes: N. La. 1, S. La. 10, W. Tex. 1, Tex. Panhandle 2, E. Tex. 2, Tex. Gulf Coast 13, S.W. Tex. 4. ¶Incl. Nev. 3, Idaho 2. **Incl. Mo. 1, Nev. 1 oil, Tenn. 3, Wash. 1.

plus 545 bbl. of distillate per day from the Tonkawa-Pennsylvanian sand (Missouri) to become the biggest such well to date in the region. A third pay zone was indicated for new Laketon-Delp field in Gray County. Phillips 2 Delp got gas-condensate production from what is believed to be a second granite wash in the field that has both Pennsylvanian granite wash and Ellenburger-Cambro-Ordovician pay.

. . . **Sterling County.** Rapid development of the new Strawn field in northeastern Sterling on the southeast Eastern Platform of West Texas is assured as a result of successful offset tests. Warren Petroleum Corp. 1 Knight, east offset to the Fuller & Fuller 1 Davis discovery, flowed more than 60 bbl. of oil per hour.

. . . **Depth record broken twice.** New Mexico's producing-depth record fell twice in April. Cities Service Oil Co. completed 1 State "AP" in Caudill field in the Devonian at 13,542-13,657 ft. to record a new oil-producing depth for the state. Continental in the same week topped that story by going to 15,120 ft. in the Devonian at 1-A Bell Lake Unit in Lea County, finding gas at 15,025 ft. This depth equals Texas' record of 15,000 ft. at Puckett gas field.

. . . **New offshore field.** Pure Oil Co. opened a new oil field in the Gulf of Mexico, 12 miles southeast of Galveston on Block 189. The discovery well flowed 142 bbl. of oil during a 15-hour test of Miocene sand at 7,520-28 ft.

Brightness on the delta . . . Barge-drilling in the Mississippi River Delta region of Plaquemines Parish, Louisiana, resulted in four new discoveries. They are: Callery, Inc.'s, gas-condensate strike at Fort Jackson on the river; Continental's Main Pass area oil strike off the east coast in Breton Sound; The California Co.'s discovery on the Joseph Bayou prospect in 23s-31e. Continued success off the Louisiana and Texas Gulf coasts gives strength to the promise of 100 rigs operating in offshore waters by January 1.

. . . **Cote Blanche.** High-gravity production was found at Cote Blanche Island after penetrating a record 12,500-ft. of salt. Shell Oil Co. dug into a salt dome to tap a new gas-condensate sand on the north side of the St. Mary Parish field, entering the salt at 585 ft. and finding bottom of the overhang at 12,425 ft. The well established the second deepest production in the world at 16,415 ft. This salt-dome penetration could mean an upswing in activity around already explored domes.

It's the Lower Cretaceous in "Ole Miss." . . . The search for Lower Cretaceous production in Mississippi gained momentum with two discoveries

Total Depth Classifications, April 1955

	A 0-1,250 ft.	B 1,250-2,500 ft.	C 2,500-3,750 ft.	D 3,750-5,000 ft.	E 5,000-7,500 ft.	F 7,500-10,000 ft.	G 10,000-12,500 ft.	H 12,500-15,000 ft.	I Over 15,000 ft.
Alabama	0	0	1	2	2	1	0	0	0
Arkansas	1	26	50	9	4	1	0	0	0
California	16	30	32	82	41	29	15	2	2
Colorado	0	1	9	38	85	4	0	1	0
Florida	0	0	0	1	0	0	0	0	0
Illinois	48	102	190	0	0	0	0	0	0
Indiana	21	33	9	0	0	0	0	0	0
Kansas	2	37	241	171	16	0	0	0	0
Kentucky	42	43	28	0	0	0	0	0	0
Louisiana	4	126	18	12	24	50	50	25	8
North	3	122	15	6	16	8	3	0	0
South	1	4	3	6	8	42	47	25	8
Michigan	2	8	10	5	5	0	0	0	0
Mississippi	0	0	0	3	21	7	8	0	0
Montana	0	3	0	3	2	4	1	0	0
Nebraska	1	1	4	8	56	0	0	0	0
New Mexico	1	23	45	25	16	7	8	6	0
Northwest	0	19	2	4	8	1	0	0	0
Southeast	1	4	43	21	8	6	8	6	0
New York	0	120	0	0	0	0	0	0	0
North Dakota	0	0	4	0	1	18	1	0	0
Ohio	23	18	40	3	0	0	0	0	0
Oklahoma	134	230	238	70	66	51	8	1	0
Pennsylvania	1	52	8	1	3	0	0	0	0
South Dakota	0	0	0	0	1	2	0	0	0
Texas	134	358	346	245	343	171	46	23	2
North Central	72	195	116	73	85	10	0	0	0
West	13	54	104	70	110	60	26	22	0
Panhandle	0	3	57	3	5	4	0	0	0
East	1	10	5	14	21	4	4	0	0
Gulf Coast	5	9	18	42	81	70	9	1	2
Southwest	43	87	46	43	41	23	7	0	0
Utah	0	4	1	0	0	5	0	0	0
West Virginia	2	19	12	4	0	0	0	0	0
Wyoming	1	7	16	12	13	7	3	0	0
Miscellaneous	2	2	0	1	0	1	0	0	0
Total April 1955	435	1,243	1,302	695	699	358	140	58	12
Total March 1955	435	1,139	1,129	751	720	313	130	60	11
Cumulative 1955	1,545	4,354	4,612	2,694	2,751	1,301	533	222	33
Western Canada	0	16	39	25	39	9	4	0	0
Alberta	0	0	4	9	34	9	4	0	0
Saskatchewan	0	6	31	14	4	0	0	0	0
Manitoba	0	10	3	0	0	0	0	0	0
B.C.-N.W.T.	0	0	1	2	1	0	0	0	0
Cumulative 1955	6	120	175	146	256	42	13	1	0

. . . one a new field in a rank area; the other, a new-pay in Pistol Ridge.

Sun Oil Co. 1 Southern Package Corp., 12 miles from Brookhaven-Tuscaloosa field in Copiah County, flowed gas-condensate on test of perforations at 14,934-60 ft., promising to establish a new producing-depth record for the state. Southern Production Co. et al opened first Lower Cretaceous production for Maxie-Pistol Ridge field in Forrest and Pearl River counties. Previous production in the area was from Eutaw and Tuscaloosa of Upper Cretaceous age and Wilcox sand of Tertiary age.

Oklahoma—New pays and many rigs. . . The pre-Permian search in the Oklahoma Panhandle added two new pay zones, the Kansas City and Fort Scott limes. Cabot Carbon opened Kansas City production at 2 Hodges in the Mocane area of Beaver County. Phillips opened first Fort Scott-Des Moines production in the region at 1 Cimarron, a Keyes field test in Cimarron County.

. . . The south is busy. The Lindsay-Bradley area of southern Oklahoma is one of the most active areas in the country. Drilling in the new deep Ordovician area in Grady and McClain counties is meeting great success. The play centers in 24-5n-5w and 4n-5w, Grady County; 5n-4w, McClain County.

Rockies pick up . . . A new discovery on the Cedar Creek anticline, new pays in Montana and Wyoming, and new locations in the San Juan basin commanded Rocky Mountain interest.

Shell Oil Co. reported a tripay discovery on the Gas City Unit at the 33X-21 well, Dawson County, Montana. The well flowed 17 bbl. of oil hourly from the Ordovician with apparent commercial production in the Mission Canyon-Mississippian and Silurian. The new field is 2 miles southeast of Yellowstone field.

. . . Muddy and Heath. L. J. Peterson 5 Wycol-Government flowed 1,760 bbl. of oil per day plus 12,000 M.c.f. of gas to give the Manderson area of Big Horn County, Wyoming, a new pay, and the second Muddy producer for the entire Big Horn basin. The first well to be completed in Northwest Sumatra field in Rosebud County, Montana, in the "A" zone of the Heath is McAlester Fuel Co.'s 5 Northern Pacific.

. . . San Juan surge. Drilling tempo in northwestern New Mexico continued its upward swing with 32 wells located in 1 week alone. New discoveries in the Pictured Cliffs sand (Upper Cretaceous) expanded the basin's producing limits in Rio Arriba and San Juan counties.

California digs deep . . . Exploration in California is accenting the deep. Wildcatters on the West Coast are busy digging around and in famous old fields. These deep wildcats accounted for four-fifths of the new oil found in the state last year, contributing most of the new reserves of high-gravity crude. There are 17 tests scheduled to probe to below 12,000 ft.

EXPLORATION HIGHLIGHTS

HUGOTON EMBAYMENT

Hugoton Race Rolls On

The Hugoton embayment of the western Anadarko basin is tops in Mid-Continent exploration this spring. Widespread discoveries, offsets, and confirmation in a three-state area make the Hugoton province one of the most attractive oil and gas-hunting grounds in the country.

Late developments in this busy province . . .

. . . Laketon - Delp gets fourth pay zone. Phillips Petroleum Co. has a second Pennsylvanian granite wash pay indicated for this Gray County field, 7 miles southwest of Miami, Tex. The 2 Delp, a ½-mile northwest offset to the field discovery well, tested gas and oil at 8,809-19, 8,824-37, and 8,979-96 ft. Upper granite wash pay was previously indicated on three tests in the zone 7,732-62 ft. This latest Phillips success gives Laketon-Delp field four potential producing zones; three granite wash pays, and one Ellenburger well, the Panhandle's sole Ellenburger producer.

. . . High Hansford success. The high success ratio in Hansford County added new pools, promising that this county will become a major gas and oil producing area of the Texas Panhandle this year.

Coats Drilling Co. 1 S. P. Miller estate, 8 miles northeast of Gruver in Section 5, Block 2, PSL Survey, is testing gas-distillate in the Cherokee-Pennsylvanian sand. This new pool-opener is 4 miles northwest of North Hansford field. North Hansford is growing fast with production assured at two confirmation and offset wells. Extension success is also assured in the Boyd-Tonkawa gas-distillate area 11 miles northwest of Spearman, Tex., at Sharples' Harvey Gas Unit, Section 4, Block 2, SA&MG Survey.

. . . Rank Dalhart exploration. The far northwestern Texas Panhandle is in line for new exploration with tests slated for Dallam and Hartley counties. Harrington, Marsh & Wagner of Amarillo will drill 1 Joe Scott, Jr. "A," a 6,500-ft. Mississippian test in southeastern Dallam County. This wildcat will go down about 20 miles southwest of Kerrick-Cisco gas field.

In the Dalhart basin W. H. Taylor et al will drill an 8,100-ft. granite test on the Bravo Dome's northeastern flank. This Hartley County test is 14 miles northwest of the basin's only producer at Hehm-granite wash field.

. . . "Inside Hugoton" discovery. The second Morrow sand discovery in recent weeks inside the limits of vast Hugoton-Permian gas field is reported at Oceanic Oil Co.'s 1 Burdge, SW NE 20-6n-16eCM, 8 miles northwest of Hooker in Texas County, Oklahoma Panhandle.

The well flowed 5,000 M.c.f. of gas per day with distillate from the Morrow sand. This Morrow strike is about 20 miles southwest of a similar discovery in Seward County, Kansas, which recently opened first Morrow production inside Hugoton field. The Oklahoma well is 2½ miles northeast of a small Des Moines-Pennsylvanian oil discovery which opened first oil production inside Guymon - Hugoton field last year.

. . . Rank Beaver oil. Cities Service Oil Co. opened rank Marmaton-Pennsylvanian oil production in Beaver County, Oklahoma Panhandle, at 1 Miles "B," SE NE NW 12-4n-24eCM, 5 miles northeast of Beaver. The discovery well pumped 60 bbl. of oil per day. The Marmaton oil is 20 miles southeast of similar production.

. . . Mocane confirmations. Cabot Carbon Co. confirmed Kansas City and Checkerboard Pennsylvanian lime production in new Northwest Mocane field, Beaver County.

Northwest Mocane field is one of the outstanding Oklahoma discoveries of 1955. The discovery well, 1 John C. Hodges, had Kansas City (the Panhandle's first), Checkerboard (a prolific producer), and Council Grove (a rank Permian gas strike) production.

. . . Basal Morrow at Interstate. A north offset has been staked to Stanolind Oil & Gas Co.'s indicated basal Morrow oil discovery in Morton County's Interstate field, far southwestern Kansas.

The basal Morrow oil strike, 1 Kansas City Life Insurance Co., is on the pump for completion. It is located in SE SE 30-34s-43w, south of big Greenwood gas field. Other Morton County activity includes a Topeka and Keyes gas discovery prospect 3 miles southeast of Interstate field at Musgrove Petroleum Co. 1-11 Jones, SE NW 11-35s-43w.

. . . 5,093-bbl. well at Pyle. Kiowa County's Pyle field in western Kansas came up with a prolific offset discovery. It is Gulf Oil Corp.-Falcon Seaboard 1 Zora, 10-29s-16w. The well was completed for a potential of 5,093 bbl. of oil per day, calculated open flow from the Mississippian. The gage is based on a flow of 401 bbl. in 18 hours on 24/64-in. and 28/64-in. chokes. Gulf is active at an east and southeast offset well in Pyle field, also.

West of Pyle field Gulf completed 1 Kinsall, a ½-mile northeast outpost and confirmation well to Nichols field for 1,000 M.c.f. of gas per day from the Mississippian. The Mississippian play in Kiowa County is one of the exploratory highlights of Kansas drilling this year. The new trend shows signs of becoming a major gas and oil reservoir.

MID-CONTINENT

KANSAS

Arbuckle Discovery In Ellsworth County

Ellsworth County has a new Arbuckle pool discovery well at Henderson Oil Co. 1 Broecky, NE SW NE 4-16s-10w.

A drill-stem test in the Arbuckle at 3,304-11 ft. got 2,220 ft. of clean oil. The wildcat is 1 mile east of the north side of Stoltenberg field.

Graham County . . . K&E Drilling Co. 1 Keith, NE NE SW 32-8s-24w, 2 miles northwest of Holley field, made 16 bbl. of oil per hour after acid treatment from perforations in the Lansing lime at 3,906-11 ft.

Kiowa County . . . A new Mississippian discovery is in prospect for this western county at Armer-NCRA 1 McKin-

ley, SE SW NE 11-28s-20w, 2 miles north of Mullinville.

The well recovered 1,560 ft. of oil and 120 ft. of muddy oil on a Mississippian test taken at 4,883-4,905 ft.

OKLAHOMA

Production Tests Due at Southeast Eureka Discovery

Viersen & Cochran 1 Landreth, NW NE SE 12-28n-9w, Southeast Eureka area in Grant and Alfalfa counties, northern Oklahoma, is due production tests.

The well flowed gas on a drill-stem test of the Bartlesville sand at 4,934-56 ft. and 4,935-87 ft.

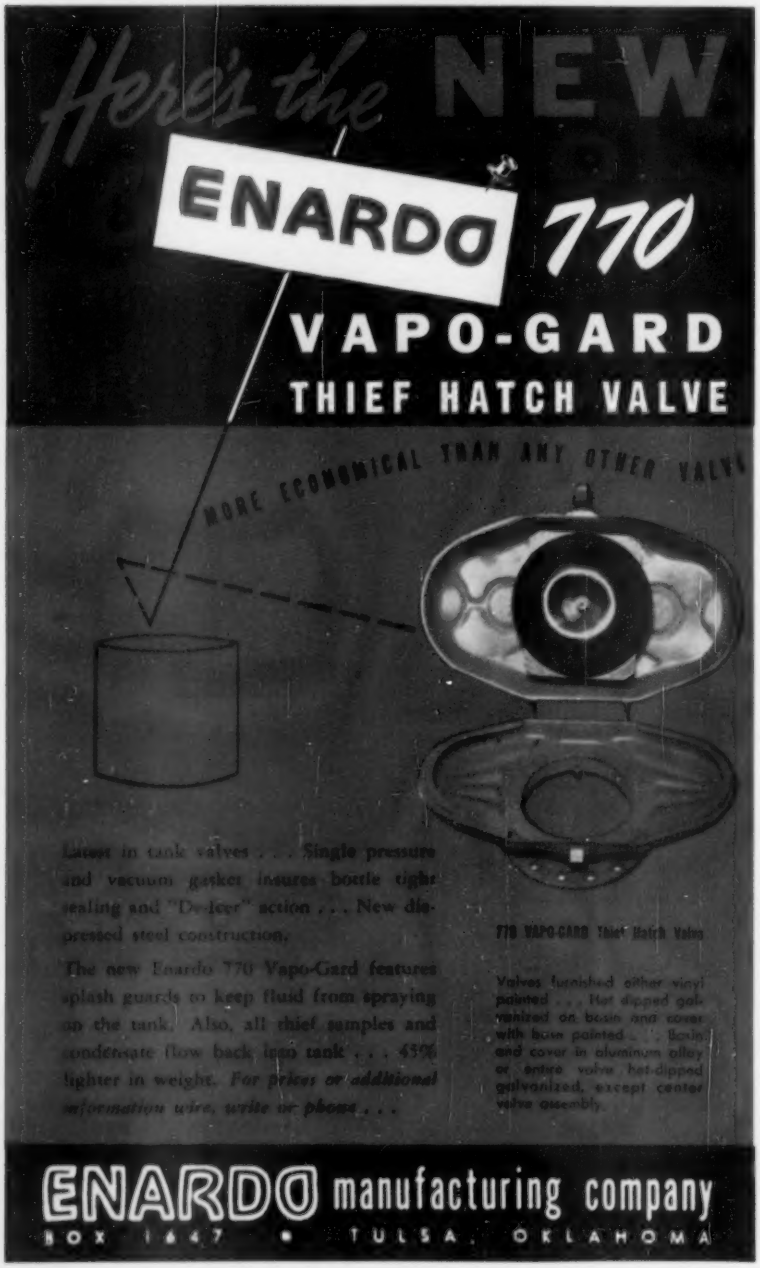
Calvert Drilling Co. 1 Feist, SE SE 11-28n-8w, Grant County, flowed 1,020 M.c.f. of gas per day from perforations in the Bartlesville sand at 4,802-20 ft. This strike is 3 miles east of Eureka-Bartlesville oil and gas field.

North Madill Report

Commercial oil is reported from the third Bromide sand at Sinclair Oil & Gas Co.'s 1 Jacks, SE SE SE 9-5s-5e, Marshall County in the North Madill area.

Recovery on a drill-stem test at 6,220-60 ft. was 330 ft. of oil and 275 ft. heavily oil-cut mud. Gas-distillate recovery was reported on a second Bromide sand drill-stem test taken at 6,124-74 ft.

Gas-distillate pay is reported at the Stanolind 1-A Griffin, SE NE NW 16-5s-5e, ½ mile west of the North Madill pool discovery well. The well flowed an estimated 2,000 M.c.f. of gas per day with a fair amount of distillate from the basal Bromide sand. The drill-stem test at 5,907-94 ft. recovered 300 ft. heavily oil and gas-cut mud.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Production Tests Due at Northwest Viola Trend Well

The Viola trend at Lone Grove in Carter County is due northwest extension at Frankfort Oil Co. 1 Cathey, NW NE NE 29-4s-3w. Production tests

The Viola trend in southern Oklahoma appears to extend from the west side of Carter County almost 30 miles to the southeast to North Marietta.

are due at the 10-mile northwest extension of Frankfort's Viola reservoir in the Lone Grove area in 12-5s-2w.

Fowler discovery . . . Frankfort's 1 Fowler, NE SE NW 17-5s-1w, reported a swab recovery of 74 bbl. oil from perforations at 5,732-5,820 ft. Production tests are under way now. This wildcat is 2 miles southeast of the 4 Williams in 12-5s-2w, which also has oil from the lower part of the Viola lime.

These two wells indicated the Viola trend to extend from the 1 Cathey about 30 miles southeast to the North Marietta area.

NORTH TEXAS

Grayson County Activity Holding Up

Northern Grayson County is still the hot spot of northern Texas. Active

rig count last week included 34 wildcats and 36 field operations.

Redrilling of an old dry hole northwest of Haggerman, ¾-mile southwest of production in Sadler-Big Mineral area, has resulted in a good pumping discovery. Ralph Abbey 1 Brooks in E. Tucker Survey, A-1194, was drilled dry to 8,395 ft. early this year. On recompletion the well made 188 bbl. of 36° oil a day from pay perforations at 7,268-80 ft. Top of pay was called at 7,250 ft. Gas-oil ratio was 200:1.

Tennessee Gas Transmission Co. 1 Foster, wildcat 3½ miles southeast of Sherman, prepared to test shows of oil in a sand from 4,695-4,710 ft. TGT's 1 Washburn, east of Sherman, prepared to drill-stem test in sand at 6,440 ft.

New work . . . New wildcats for Grayson County included a 6,500-ft. test ½ mile east of Sadler, by Kay Kimbell as 1 R. W. Bullard. Location is in W. S. Robinson Survey, A-190. J. B. Amonett, Sherman, will drill 1 Rose Knaur as a 5,000-ft. test 4 miles northwest of Denison in H. B. Thomas Survey, A-1272. Standard Oil Co. of Texas has located 1 G. P. Shearer 5½ miles northwest of Sherman. Location is in Simon Draper Survey, A-381 and contract depth was 10,000 ft. Stanotex 2 Clyde Moore, also to 10,000 ft., will go down 1½ miles northwest of Sherman, in H. Brown Survey, A-86.

Viola discovery in Clay County . . . Cities Service Oil Co. 1 Scheer, 1 mile northeast of Henrietta, has opened new Viola limestone production. On 9-hour test through 24/64-in. choke, the flow was 180.36 bbl. of 42.9° oil, giving it a calculated daily potential of 480.96 bbl. Pay was open hole at 6,190-96 ft. Tubing pressure was 950 psi. and gas-oil ratio was 830:1.

WEST TEXAS-NEW MEXICO

WEST TEXAS

Gulf Well in Mitchell County Is Prospect

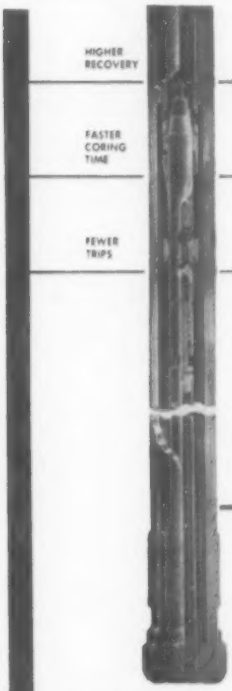
Gulf Oil Corp. had a discovery well in the making at its 1 Chappell, 17 miles south of Westbrook, in Section 29, Block 18, SPRR Survey.

Tentative top on the Mississippian was 7,793 ft., on elevation of 2,258 ft. A drill-stem test at 7,780-7,845 ft. had gas in 7 minutes and fluid in 3 hours and 20 minutes. After cleaning into pits for 15 minutes the well flowed 47.89 bbl. of oil in 10 hours and 15 minutes.

Operators drilled ahead to 7,894 ft., entering the Ellenburger at 7,866 ft. A test in that formation, at 7,865-98 ft., open 4 hours, recovered sulfur water with no shows. Casing was being run for completion attempt.

Strawn prospect . . . Free oil was recovered on a drill-stem test in the Strawn at Union Oil Co. of California and Sun Oil Co. 1 Wallace, 34-12-H&TC, 16 miles southeast of Colorado City and 4 miles north of Pennsylvanian production in McCabe field.

Recovery was 1,860 ft. of oil, 240 ft. of oil and gas-cut mud, plus 630 ft. of salt water, on a 4-hour test at 6,975-7,010 ft. Flowing pressure ranged from 140-800 psi.



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GULF COAST

TEXAS GULF COAST

Fourth Pay Zone Opened In Third Algoa Producer

Superior Oil Co. has a new-pay discovery and extension well in the Algoa area, western Galveston County.

Its 1-B Cooper Unit, ½ mile northeast of the discovery well, is rated good for 12,800,000 cu. ft. of gas per day, open-flow calculation, with a gas-condensate ratio of 18,820 cu. ft. per barrel. Shut-in pressure is 8,000 psi. Gravity of the condensate is 43.7°.

The well is the company's third for the field. Its pay zone is the fourth.

The company's discovery well, completed a year ago, was a gas-condensate producer in sand at 11,659-94 ft. Its second well, northwest of the discovery well was productive of gas and condensate from sand at 9,390-9,408 ft. and oil from sand at 9,538-41 ft.

Superior's next well is located southwest of the discovery producer. Dillard & Waltermire Drilling Co. has a well drilling near the pay about 2,000 ft. north of Superior's discovery well.

New Gas-Condensate Pay Uncovered at Indian Hills

Discovery of a new gas-condensate reservoir in northern Harris County is indicated in a well drilled by M. C. Hoover at 1 Grisham, in the G. Galbraith Survey, 5 miles northeast of Tomball.

The well, in Yegua sand, perforated at 6,004-07 ft., flowed an ungaged volume of gas and condensate while cleaning. It has been shut in pending potential tests with pressure of 2,157 psi.

Location is 4,100 ft. northwest of nearest wells in Indian Hills field, productive of oil from Cockfield sand at 5,500 ft.

SOUTH LOUISIANA

Second Producer Confirms Joseph Bayou Discovery

The Texas Co. has confirmed its recent oil discovery in the Joseph Bayou area, in the Mississippi River delta of Plaquemines Parish.

Its 3 State Lease 2474, southeast offset of the discovery well, completed last month, produced at the rate of 130 bbl. of 42.8°-gravity oil per day, flowing through an X-27 choke. Tubing pressure gaged 1,225 psi., and gas-oil ratio 485 cu. ft. per barrel.

Producing interval is 8,828-47 ft. The discovery well has perforations at 8,798-8,814 ft.

The new area, originally listed as a new field, now is carried as a northeast extension of the active and prolific Dixon Bay field. The field is adjacent to and underlies Mississippi River's Southwest Pass.

New Deep Field Uncovered In Northern Acadia Parish

Vincent & Welch and George McGhee, of Lake Charles, La., are opening a new deep Frio field 10 miles

Location (indicated by arrow) of Vincent & Welch's new oil-discovery well, 1 Miller, in North Central Acadia Parish.

north of Crowley, in North Central Acadia Parish.

Their discovery well, 1 Miller, in 13-8s-1w, is estimated good for 175 bbl. of oil per day, flowing through 9/64-in. choke. Flow is under pressure of 1,680 psi. with gas-oil ratio of 1,500 cu. ft. per barrel. Gravity of the oil is about 40°.

Its Frio pay is perforated at 10,186-91 ft. Hole was drilled to 10,576 ft.

Location is about 4 miles northwest of Maxie field, nearest production of consequence, and about 5 miles east of Iota field.

Two Deep Sands Produce In West Gueydan Outpost

Two deep sands already have been proved productive in Columbia Carbon Co.'s stepout operation, 1 Vermilion, a mile north of West Gueydan field, in northwestern Vermilion Parish.

Deeper of these was perforated at 11,138-42 ft. and 11,144-46 ft. Tests through 5/32-in. choke got a flow rate of 2,392,000 cu. ft. of gas per day. Gas carried a spray of 44.2°-gravity condensate. Pressure gaged 5,700 psi.

Flow from the shallower sand, perforated at 10,792-96 ft., was at the rate of 240 bbl. of 39.4°-gravity oil per day, also through 5/32-in. choke. Flowing pressure was 2,825 psi., and gas-oil ratio 3,240 cu. ft. per barrel.

Additional sands at higher levels will be tested before the well is completed. Total depth is 12,248 ft.

Rousseau Outpost Test Confirms Discovery Pay

Gas-condensate production in the Rousseau area, 5 miles down Bayou Laforche from Thibodeaux, in northwestern Lafourche Parish, is being extended nearly a mile to the southeast by the area's third well.

The extension well is Humble Oil & Refining Co.'s 1 Rousseau Gas Unit 1, in 13-15s-17e. It flowed at the rate of 46.56 bbl. of 56.6°-gravity condensate and 3,285,000 cu. ft. of gas per day during completion tests through 3/16-in. choke. Pressure was 2,150 psi.

Production is from the 9,600-ft. sand in which the field's discovery well was completed. Pay is perforated at 9,572-76 ft. The discovery well's interval is 9,580-86 ft. The field's second well produces from a deeper sand, perforated at 10,429-37 ft. The latter two wells were drilled by Hassie Hunt Trust.

EASTERN INTERIOR

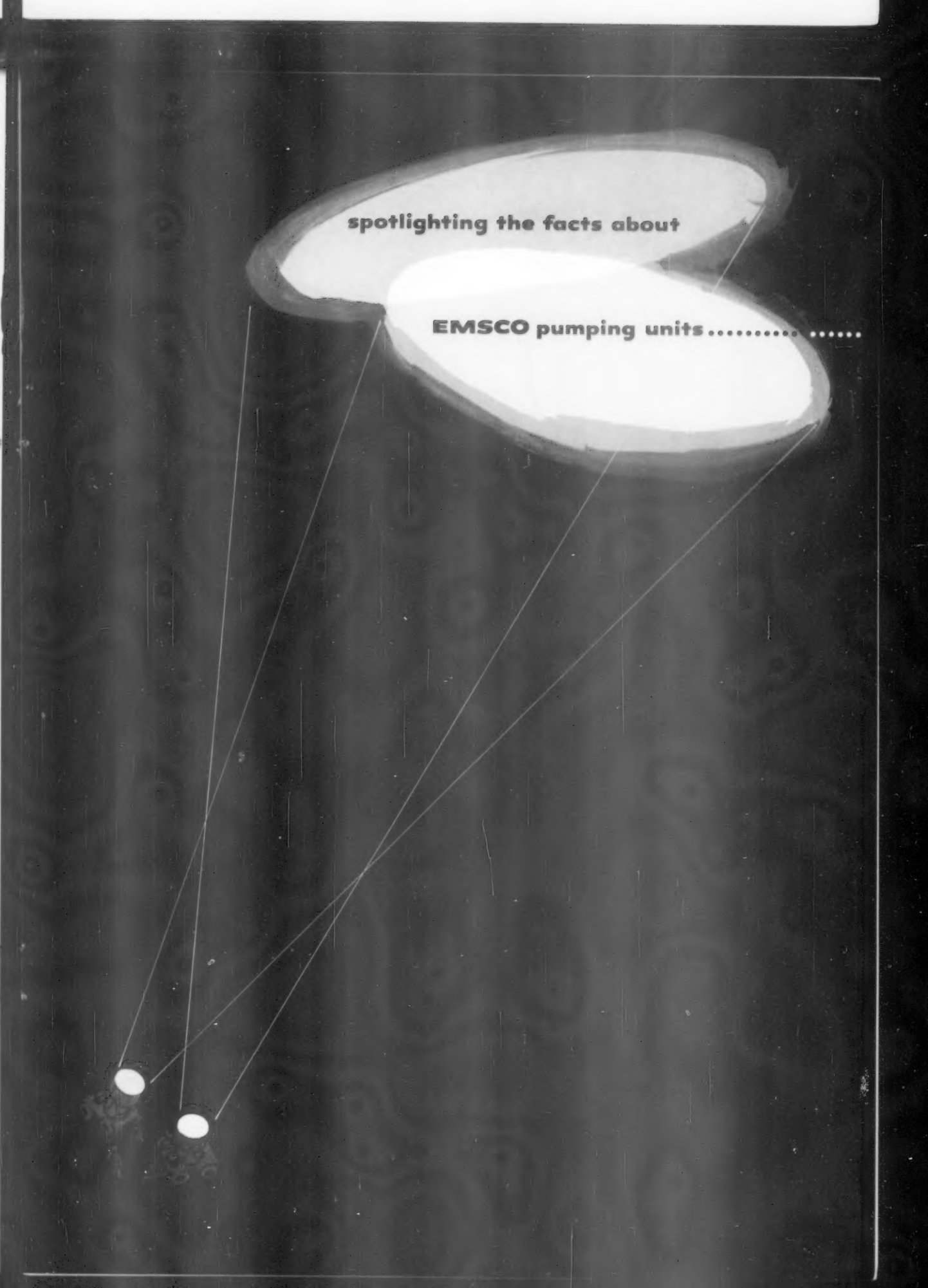
ILLINOIS

● Another pool opener for Edwards County, Illinois, has been confirmed by tests at Oslager Drilling Co. 1 Clark-Bowers, NE SE NE 5-2s-10e. Well was drilled on acreage farmed out by Toklan Oil Corp., Tulsa and on 24-hour swabbing test made 400 bbl. natural. Well is producing from the Rosiclaire formation and also had favorable shows in the McCloskey lime.

Toklan Oil Corp. is moving in on a west offset to the Oslager well at a location described as NE SE NE of Section 5-2s-10e for a McClosky lime test. Toklan holds leases on approximately 600 acres in the immediate vicinity of the discovery well and on basis of geological interpretation plans to have 12 to 14 additional locations. This is the second pool opened by Toklan in Illinois in the past year.

Mutual Oil & Gas Co. completed 1 J. A. Wacker, NW SE NW 30-1s-1e, Jefferson County, 8 miles south of Centralia, for 150 bbl. of oil per day, natural, from the Cypress sand at 1,775-84 ft. Four more wells are nearing completion in this new pool. The area is 1 mile from Cypress and Benoist sand production. There are six operators busy in this Jefferson County area.

● In Clay County, 3 miles north of Sailor Springs, Coy Oil Co. has a new pay zone at 1 Katie Stanley Unit, NW SW SE 2-4n-7e. It is the Aux Vases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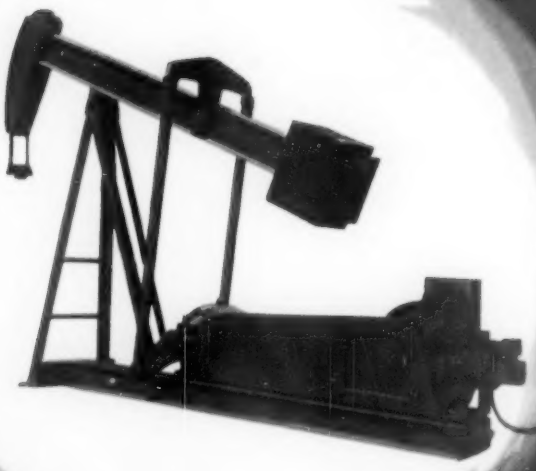

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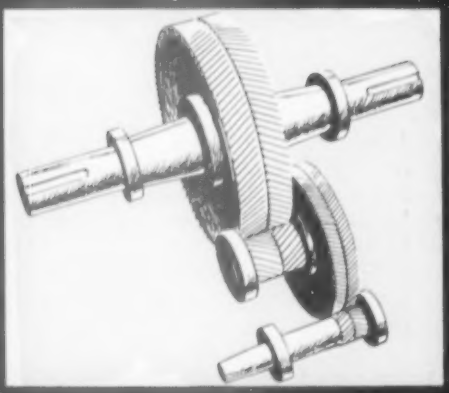

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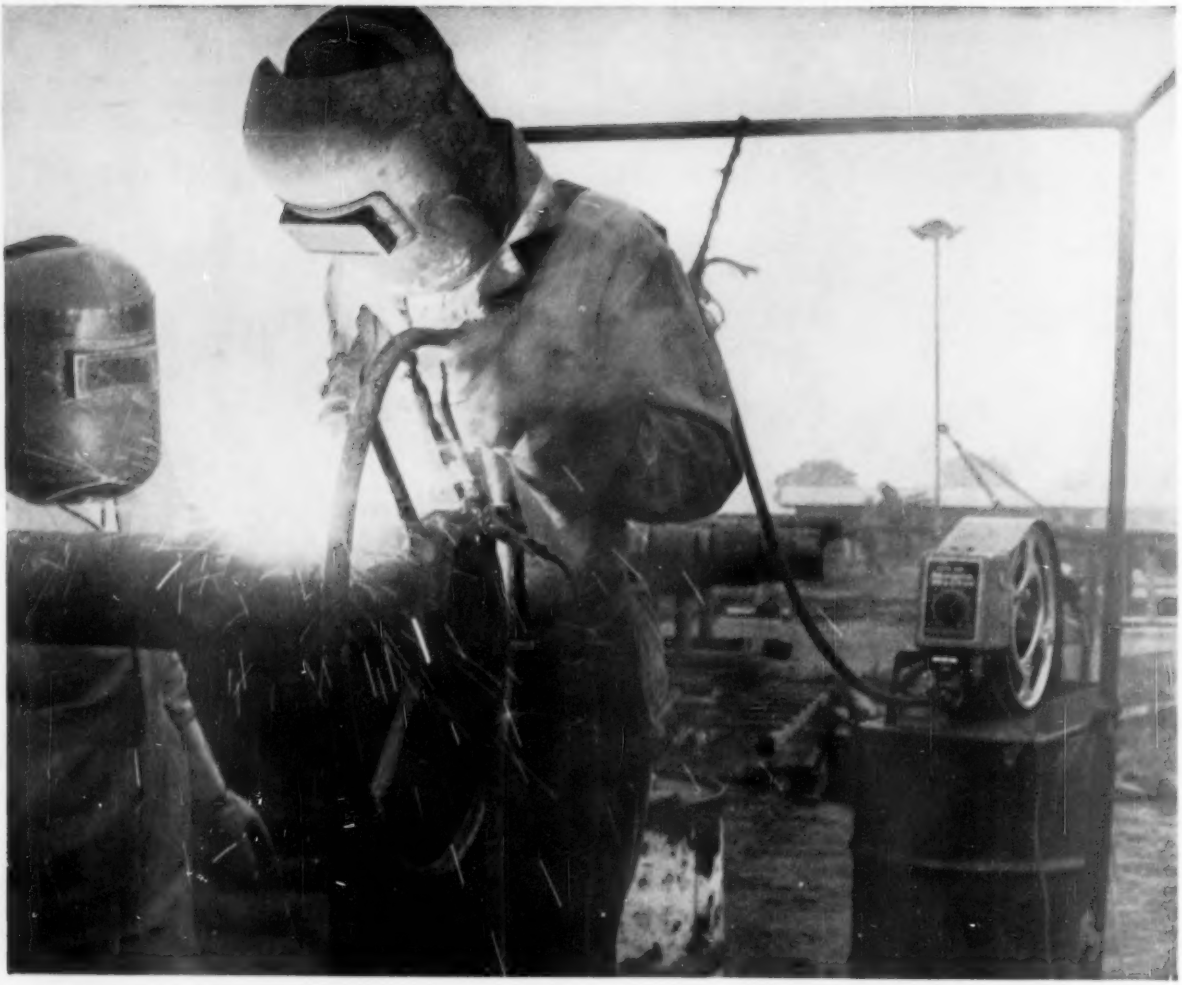

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lime at 2,819-47 ft. A drill-stem test got 1,320 ft. of gas, 280 ft. of mud-cut oil at 2,798-2,850 ft.

● In Clay County A. A. Richey 1 General American Life Insurance Co., SE SE NE 13-5n-5e, flowed 513 bbl. of oil per day from the Rosiclare lime at 2,420-27 ft., natural. This is a 1-mile well.

GREAT LAKES

MICHIGAN

First Tests Made at Northville Niagara Well

The Taggart Co. 1 Crowe-Fraser et al, NE SW SE 7-1s-8e, Northville Township, Wayne County, first Michigan oil producer on the Northville structure, flowed 195 bbl. of oil natural in 10 hours on first tests. It appeared that this well would produce at an even greater rate when the hole is cleaned of mud.

Completion in the Niagara will add another pay zone to this multizone oil and gas pool. The field has Dundee, basal Salina - Niagara, Trenton, and Black River production.

APPALACHIAN

PENNSYLVANIA

Buffington Township, Indiana County, Southwest Pennsylvania, Felmont Oil Corp., 1 Marjorie Shenkel, reached the chert at 8,230 ft. and had gas at 8,230-34 ft., gaging 646,000 cu. ft. The Oriskany sand was at 8,290-8,306 ft., with no gas. It has been shut down at 8,317 ft., for testing.

● Unity Township, Westmoreland County, Peoples Natural Gas Co., 2-4037 Fred Musnug, reached the Tully at 7,850 ft., and is drilling at 8,345 ft.

WEST VIRGINIA

In Union district, Preston County, West Virginia, Columbian Carbon Co., 1-1207 Lawrence Berger, rank wildcat, elevation 2,543 ft., completed gaging 1,632,000 cu. ft. gas after Hydrofrac, Oriskany sand 4,981 ft., gas 5,034-36 ft., TD 5,040 ft.

OHIO

Two short extensions to pools in Jackson Township, Muskingum County, were completed as good producers. R. H. Helmick et al, 5 Carl Sheppard, Section 14, logged the Clinton at 3,080-3,130 ft. with 1,200 ft. oil natural and 430 bbl. in 10-hour test after fracture treatment.

● In the new pool in Milton Township, Wayne County, the Slagter Producing 2 Joseph Graber, Section 17, made 725,000 cu. ft. gas and 150 bbl. oil in a 24-hour test after fracturing Clinton, found at 3,315-37 ft.

EASTERN KENTUCKY

In the Pike County sector of Big Sandy gas field and located on Long Fork, Kentucky West Virginia Gas Co. has completed 6259 Sebastian C. Johnson as a shallow (TD 1,429 ft.) Pennsylvanian salt sand gas well. Sand, topped at 1,365 ft., had gas from 1,408 to 1,414 ft. which gaged initially natural at 783,000 cu. ft. daily. Pressure rocked up to 445 pounds in 9 hours.

PACIFIC COAST

CALIFORNIA

California Activity Above 1954 Level

California drilling activity, as reflected by notices to drill filed with the Division of Oil & Gas, is running about 20 per cent above that of 1 year ago. At mid-May 1,056 applications had been filed. This compared with 883 during the first 4½ months of 1954. Since the townlot drilling spree at Huntington Beach has accounted for approximately 175 new wells, this development can be said to be the sole cause of the increase.

After trailing last year's record for the first 4 months, exploratory drilling is tending to increase. At the end of April 144 tests had been drilled as compared with 210 in the like period of 1954. This month's activity appears it will exceed the 39 tests of May a year ago.

New Fresno Field Possible

About 1½ miles southeast of the Burrel field, Fresno County, a wildcat of The Texas Co. was showing signs of being a new pool opener. Its 1 Burrel ranch in 12-17s-18e had 5½-in. casing set at 6,873 ft., approximate plugged back depth after drilling to 8,275 ft.

Wheeler Ridge Discovery

Richfield Oil Corp. may have scored a shallow pool discovery about ¾ mile northeast of Wheeler Ridge production in Kern County. After drilling to 11,064 ft. and redrilling to 9,001 and 3,720 ft., 87-22 Kern County Land-G showed favorable results on a drill-stem test at 3,510-3,720 ft. About 1,700 ft. of gassy oil, 17.3° gravity, were recovered after the tool was open 3 hours. The operator then ran pipe to 3,500 ft. Location of the outpost, originally an Eocene test, is in 22-11n-20w.

WESTERN CANADA

ALBERTA

Carrot Creek Area Wildcat Hints Success

Richfield Oil Corp. found an encouraging showing of light-gravity oil and some gas at its wildcat in the Carrot Creek area of west-central Alberta, and a flow of gas at another well in the Smoky River region of the province. Both wells are situated on acreage farmed out to Richfield. The Carrot Creek well found its showing in the D1 Devonian zone while the Smoky River test flowed gas from both the Cadomin and a zone believed to be Nikanassin, during drill-stem tests in those formations.

The Smoky River wildcat is on LSD 9, 20-66-4w6, 52 miles southwest of Sturgeon Lake production. The Carrot Creek well is on LSD 6, 8-55-13w5.

Westward Ho Report

The Westward Ho oil discovery team has indicated success at a ⅜-mile southwest follow-up to that oil discovery. The follow-up well entered the Mississippian (discovery pay of the initial well) 28 ft. lower than the discovery well, has so far penetrated 39 ft. of that lime, and is continuing to core preliminary to further testing.

The well, Hudson's Bay-Oilwell Operators 3-8 Westward Ho, LSD 3, 8-33-4w5, 55 miles northwest of Calgary and 17 west of Olds, recovered 2,000 ft. of green muddy oil emulsion of which 1,000 ft. was water cushion, and 500 ft. of drilling mud on test at 8,811-55 ft.

Successful Wildcats

SOUTHWEST TEXAS

Gonzales County: Pontiac Refining Co. 1 Weaver, Thomas Wright Sur., A-472 (4 mi. southeast of Nixon). IP 457 M.c.f.

LEGAL

Sealed bids will be received until June 9, 2:00 P. M. Mountain Standard Time, and opened at that time in the office of the Superintendent, Fort Belknap Consolidated Agency, Harlem, Montana, for the leasing of 5,371.93 acres of Tribal land and 27,600.12 acres of allotted Indian land located in Township 30 N., Range 24 E., Township 31 N., Range 24 E., Township 31 N., Range 25 E., and Township 30 N., Range 25 E., Blaine County, Montana for oil and gas mining purposes. For further detailed information and a list of lands advertised call or write: Darrell Fleming, Supt. Fort Belknap Consolidated Agency, Harlem, Montana, Telephone 5-R-4.

daily, open flow, Sparta 616-21 ft. (perforations). TD 1,432 ft. (New field.)

TEXAS GULF COAST

Fort Bend County: Horace Coon, Jr., 1 Gulf, P. F. Ward Sur. 66, A-462 (Long Point dome). Shut-in gas well, shut-in pressure 1,675 psi., perforations 5,175-5,220 ft. TD 5,800 ft. (New pay and extension on Long Point dome.)

EAST TEXAS

Anderson County: Traders Oil Co. of Houston 1 Vickery, W. R. Wilson Sur., A-66, 1 mi. SW Slocum. IPP 5 BOPD, 19.6°, Wilcox 490 ft. TD 528 ft.

Cherokee County: Sinclair Oil & Gas Co. 1 O'Neal, J. M. Procella Sur., A-43, 4 mi. W East Texas field production. IP 17 bbl. distillate, and 319,000 cu. ft. gas, ¼-in., pressures and gravity not reported. Travis Peak 8,192-8,250 ft. TD 8,272 ft. elev. 400 ft.

Coke County: Humble Oil & Refining Co. 2 Helen Weaver, Sec. 16, I. N. Moreland Sur., 7 mi. S Robert Lee. IP 236 BOPD, ¼-in., 44°, TP 725 psi., GOR 2,180, lower Strawn pay 6,240 ft. TD 6,592 ft.

TEXAS PANHANDLE

Dallam County: Shamrock 1 Foxwaorth Skaer et al, I-T, Sec. 89, T&NO. IP 3,158 M.c.f. of gas per day, Cisco 3,446-98 ft. TD 3,525 ft. (Gas discovery).

Hansford County: Sharples Oil Co.-Baker & Taylor Drilling Co. 1 O'Donnell, NW NW SE 45-81, H&TC. IPF 3,071 M.c.f. of gas per day plus 4 BD per Mil. c.f.g., Morrow 7,186-7,200 ft. TD 7,522 ft. (Gas-distillate discovery).

WEST CENTRAL TEXAS

Brown County: Bridwell Oil Co. 2 Brewer, Sec. 43, BAL Sur., 5 mi. SW Abilene. IPP 45 BOPD, 36°, GOR zero, Palo Pinto 3,279 ft. TD 3,282 ft.

Fisher County: General Crude Oil Co. 4 Aiken, 249-3-H&TC, 12 mi. W Longworth. IP 151.5 BOPD, 5/8-in., 41°, TP 50 psi., GOR 723, lower Strawn 6,793-6,809 ft. TD 7,577 ft.

Haskell County: Lawson Petroleum Co. 1 Scott, Wm. Harris Sur. 144, 15 mi. SE Haskell. IP 528 BOPD, ¼-in., TP 100 psi., 40°, GOR 500, Caddo lime 4,889 ft. TD 4,980 ft.

Nolan County: A. W. & Blair Cherry 1 Everett, 107-1A-H&TC, 6 mi. NW Blackwell. IP 220 BOPD, ¼-in., TP 325 psi., GOR 853, 48.5°, Ellenburger 6,464 ft., pay 6,516 ft., elev. 2,235 ft. TD 6,532 ft.

Stonewall County: Anderson & Word 1 Hawkins, 7-D-H&TC, 7 mi. NE Aspermont. IPP 102 BOPD, 41°, GOR 550, conglomerate pay 5,926 ft. TD 5,979 ft.

Throckmorton County: Ward Drilling Co. 1 Hickman heirs, Sec. 1181, TE&L Sur., 5½ mi. E Woodson. IP 192 BOPD, 6/64-in., TP 700 psi., 42°, GOR 550, Mississippian lime 4,454-64 ft. TP 4,513 ft.

NORTH TEXAS

Baylor County: W. E. Butler 1 Dykes, 15-1-D&W Sur., 4 mi. E Bomarton. IPP 23 BOPD, 35°, GOR 150, Tannehill sand 1,468-72 ft. TD 1,509 ft.

Clay County: Bobby Burns 1 Seibold Bros., Sec. 8, P. McMahon Sur., A-867, 6 mi. SW Henrietta. IPP 48.7 BOPD, 42°, GOR 275, pay 4,836-54 ft. TD 5,053 ft.

Jack County: F. Kirk Johnson 1-A Shawn, Pleasant Roland Sur., A-497, 2 mi. S Wizard Wells. IP 7,000 M.c.f., open flow, pressure not reported, pay 5,355-75 ft. TD 5,700 ft.

F. Kirk Johnson 1 Swetnam, Geo. Taylor Sur., A-843, 2 mi. S Dees Atoka field. IP 1,000 M.c.f. gas, open flow, pay 5,336 ft. TD 5,700 ft.

Russell Maguire 1-A Price, H. Chreisham Sur., A-151, 7 mi. SE Jacksboro. IP 252 BOPD, 14/64-in., TP 900 psi., 42°, GOR 1,000, conglomerate 5,189-94 ft. TD 5,390 ft.

Marine Production Co. 1 Sewell, E. S. Dunn Sur., 1 mi. SE Jacksboro. IP 105 BOPD, 16/64-in., 43°, TP 300 psi., GOR 1,000, pay 5,198 ft. TD 5,343 ft.

Young County: Miller & Banks 4 Glidwell, J. Davidson Sur., A-1418, 10½ mi. SE Graham. IPP 41 BOPD, 39°, GOR 250, Strawn 1,561-70 ft. TD 1,596 ft.

NORTHWEST NEW MEXICO

Sandoval County: Humble Oil & Refining Co. 1 Jicarilla "B," SW NE NE 1-22n-5w. IPP 50 BOPD, Sanastee discovery, new oil field. TD 6,368 ft. Morrison.

WEST TEXAS

Crane County: Gulf Oil Corp. 244 Waddell, SW SW 14-B21-PSL Sur., on N side of Blk. 21-Waddell field. IP 329 BOPD, ¼-in., TP 300 psi., GOR 408, 45.7°, Ellenburger pay 6,239 ft. TD 6,325 ft.

Dawson County: Forest Oil Corp. 1 Love, 43-33-T5N-T&P, 15 mi. SE Lamesa. IPP 147 BOPD, 38.6°, GOR 532, Spraberry 7,239-7,540 ft. TD 7,626 ft.

Garza County: Curtis R. Inman 1-A Roy, 133-5-H&GN Sur., 5 mi. NE Justiceburg. IPP 63 BOPD, 37°, GOR 175, pay 2,560 ft. TD 2,790 ft.

Upton County: Humble 1-D Rosa Barnett, 83-Y-GC&SF, 20 mi. NE McCamey. IP 1,615 BOPD, ¼-in., TP 1,250 psi., GOR 364, 54.8°, top Ellenburger 11,555 ft., pay 11,775 ft., elev. 3,097 ft. TD 11,855 ft.

Yoakum County: H. L. Cain 1 Keller, 541-D-J. H. Gibson Sur., 6 mi. SW Plains. IPP 32 BOPD, GOR 331, pay 5,248 ft. TD 5,312 ft.

KENTUCKY

Daviess County: Felmont Oil Co.-EMD&G 3 St. Joseph Academy, SW SE SE 16-O-27. IPP 60 BOPD, Palestine 1,299-1,305 ft. TD 1,321 ft. (Opens South St. Joseph pool).

Muhlenberg County: J. Darst 1 McKinney, SW NE SW 21-H-27. IPP 100 BOPD, Benoist 729-743 ft. TD 743 ft. (Opens Hardeson pool).

WEST VIRGINIA

Preston County, Union district: Columbian Carbon Co. 1-1207 Lawrence Berger, elevation 2,543 ft., 1,632,000 cu. ft. of gas after Hydrofrac, Onondaga 4,799 ft., chert 4,859 ft., Oriskany sand 4,981 ft., gas 5,034-36 ft. TD 5,040 ft.

Tucker County, Licking district: Hope Natural Gas Co. 9924 Alex Nestor Hrs., elevation 1,764 ft., 215,000 cu. ft. of gas after Hydrofrac, Onondaga 4,474-4,644 ft., gas 4,507-13 and 4,565 ft., Oriskany sand 4,644-4,743 ft., Helderberg 4,743 ft. TD 5,123 ft.

SOUTH LOUISIANA

Assumption Parish: Cities Service Oil Co. 1-A Brownell-Kidd, 13-12s-12e. IP 12,000 M.c.f. daily, open-flow potential, with 30 BO and 10½ BW per M.M.c.f., 45.9°, perforations 13,638-48 ft. TD 15,205 ft. (New pay in Bay Natchez field.)

Jefferson Davis Parish: Pan American Production Co. and Austral Oil Exploration Co., Inc., 1 Benoit et al, 25-11s-5w. IP 6,800 M.c.f. daily, spray distillate, 3/16-in., flowing pressure 8,500-9,500 psi., perforations 12,778-88 ft. TD 12,828 ft. (New pay in Thornwell area.)

Lafourche Parish: Humble Oil & Refining Co. 4 Lake, 35-17s-21e. IP 208 BOPD, ⅛-in., 36.9°, perforations 11,174-86 ft. TD 12,100 ft. (New pay in La Rose field.)

St. Bernard Parish: Republic Natural Gas 2 State Lease 2464, Block 1, Breton Sound area (in Breton Sound). IP 20 BCPD, ¼-in., 41.3°, GOR 15 M.c.f. per bbl., perforations 7,421-23 ft. TD 8,999 ft. (New offshore field.)

NORTH LOUISIANA

DeSoto Parish: Latex Oil & Gas Co., Inc., 1 Atkinson heirs Unit, 35-14n-15w. IPF 264 BOPD, 18/64-in. choke, 32.3°, GOR 329:1. perfs. Transition zone 6,594-6,600 ft. IPF 525 BOPD, 18/64-in., 41.5°, Page 6,420½-26 ft. TD 6,800. ft. (New oil pays in Bethany-Longstreet Pettit trend field.

ARKANSAS

Union County: Extension to Urbana field; Parks & Meabon 1 Gwin, C SE NE NW 4-18s-13w. IPP 15 BOPD, Travis Peak 3,387-91 ft. TD 3,575 ft.

Extension to Urbana field: Parks & Meabon 2 Gwin, C SE SE NW 4-16s-13w. IPP 6 BOPD, Nacatoch sand 2,283-2,333 ft., and from open hole 2,333-37 ft., 25°. TD 2,337 ft.

OKLAHOMA

Beaver County: Cabot Carbon Co. 1 Barby "A," C NW NW 1-4n-25eCM. IP 20,000 M.c.f. of gas per day, 6,764-6,837 ft. TD 7,180 ft. (Gas discovery).

Cabot Carbon Co. 1 Judy, C NE SW 1-5n-24eCM. IP 4,750 M.c.f. of gas per day, basal Morrow 6,204-10 ft. TD 6,665 ft. (Gas discovery).

KANSAS

Barber County: Purcell & Mull 1 Landis, SE SE SE 21-34s-11w. IPP 282 BOPD, Mississippian 4,618-50 ft. TD 4,650 ft. (Opens Landis pool).

Kingman County: Petroleum, Inc., 1 Kibbe, SE SE SW 34-29s-9w. IP 1,600 M.c.f. of gas per day, Mississippian 4,170-85 ft. TD 4,271 ft. (Gas discovery).

Petroleum, Inc., et al 1 Nirschl, NW NW SW 6-30s-8w. IP 1,525 M.c.f. of gas per day, Mississippian 4,168-74 ft. TD 4,720 ft. (Gas discovery).

Kiowa County: GMR 1 Piester, SW SW NW 24-29s-16w. IPP 153 BOPD, Mississippian 4,598-4,608 ft., 42°. TD 4,675 ft. (Opens Soldier Creek pool).

Sheridan County: Jones, Shelburne & Farmer 1 Custer, NW NW SE 12-10s-26w. IPP 320 BOPD, Lansing lime 4,024-29 ft. TD 4,090 ft. (Opens Custer pool).

CALIFORNIA

Kern County: The Texas Co. 6 Richards estate, NW NE 22-31s-29e, IPF 259 BOPD, ¼-in. choke, 33.7° gravity, 200 M.c.f. gas, 34 per cent water cut, perfs. 5,856-6,349 ft., TD 6,400 ft. (New Chanac sand, Miocene, pool in Mountain View field.)

WYOMING

Johnson County: Continental Oil Co. 75 Unit, NW NE SE 8-42n-79w. IPP 240 BOPD, Tensleep discovery, new pay. TD 7,417 ft. Tensleep.

COLORADO

Morgan County, South Jackpot: Lion Oil Co. 1 Mollie, C SE SE 11-6n-59w. IPF 112 BOPD, "D" sand discovery, new field. TD 6,551 ft. "J" sand.

Rio Blanco County: Equity Oil Co. 1 Erick Clubine, C NE NE 18-3s-95w. IP 2,500 M.c.f. of gas per day, Green River discovery, new field. TD 2,693 ft. Wasatch.

Roustabout on Top

Whaley now president of fifteenth largest oil firm

FOR a man who didn't want to get into the oil business in the first place, W. C. (Bill) Whaley has come a long way. He's the president of the newly merged Sunray Mid-Continent Oil Co.

The merger this month of the 35-year-old Sunray Oil Corp. and Mid-Continent Petroleum Corp. produced a petroleum giant. The new firm has assets valued at $486 million and is rated fifteenth in the industry. But mergers are old hat to Whaley.

He has gone through two and each time came out with more responsibility. But this one gave him his largest task, helping other top executives of the two firms quickly shape up a winning team.

Whaley directs these activities from his office on the thirteenth floor of the swank, new Sunray Mid-Continent building in Tulsa. His first chief task, he said, is adjusting personalities. Getting men to work together on a new team and resetting their goals to a new program are the first worries of most mergers, Whaley observes.

The Sunray Mid-Continent executive spends long hours at this challenging work, and he finds it still interesting after more than 40 years in the industry. That's strange because as a young man Whaley tried to avoid the oil business. "In those days, everyone in the oil game worked 12 hours a day, 7 days a week," he said.

Whaley was born into an oil family at Santa Maria, Calif. His father, Jack H. Whaley, was a drilling superintendent and production man who traveled over the world for oil companies before he retired several years ago. So young Whaley knew first-hand about the hard work and long hours.

Out of cash . . . He set his sights on something less strenuous. He worked in the California oil fields only to save money to finance study in accounting and law in Los Angeles. When his money ran out, he would return to the oil fields, work long enough to replenish his cash and go back to school.

Finally, during one of his periods of low cash, Whaley returned to the oil fields—this time he stuck. He took a job as a roustabout with Commercial Oil Co. of Coalinga, Calif., in 1911. From 1915 to 1924, with the exception of 2 years with the Army overseas, he worked in fields in California, Wyoming, Oklahoma, Texas, Montana, Kentucky, and the British West Indies. By this time he was hardened to the 12-hours-a-day, 7-days-a-week routine.

In 1924 he joined the former Barnsdall Oil Co. as a driller. He moved up to vice president in 1931, director in 1940, and general manager of California operations in 1941. When Barnsdall merged with Sunray in 1950, Whaley became a Sunray director and vice president. He was elected Sunray president in 1952 and retained that position when Sunray and Mid-Continent merged on May 16.

Whaley modestly attributes what success he's had to his friends. He explained he has been fortunate to know many fine men who took time out to teach him the intricacies of the business they had picked up over the years. He especially cherishes a long friendship with P. M. Payne, former Gypsy Oil Co. executive and an expert on oil-property evaluation.

Tops for young men . . . Whaley observed the oil business is still one of the best in the country for a young man with ambition. But he's not sure he would get into it again if he had his life to live over.

The executive said very few other industries take a greater interest in the individual man, seek out youngsters with talent and ability, help them grow, give them a chance to step into better jobs. This emphasis on people is a part of Whaley's own business philosophy. In this connection, he passed on this tip to younger men in the industry with eyes toward an executive position.

"Know people. Evaluate them, their relation to the job, and their ability to perform. But above all, like them and be sincerely interested in their future."

Whaley hedged a bit when asked if he would get into oil if he were 20 again. "I guess so," he said, "but I still like the law. I come into contact with lots of lawyers in this business and I enjoy matching wits with them."

The Whaleys have two sons. Robert Lee is studying medicine at McGill University in Montreal. John Patrick is taking prelaw at Pomona College in California. They get together now only at vacation time when they can share their father's love of hunting and fishing.

Daniel L. Hussey has been named an assistant general manager in the East Coast manufacturing division of Esso Standard Oil Co. Hussey, former general superintendent of the Bayway, N. J., refinery, has been general refinery manager and a director of Iranian Refining Co. since October 1954.

William W. Lomerson has been promoted to manager of Buffalo Oil Co.'s southern region, which includes the West Texas and New Mexico areas. He will headquarter in Fort Worth. **G. R. Carter** has been appointed division manager for the Midland, Tex., area. Other changes announced by Buf-

W. W. LOMERSON

G. R. CARTER

falo are **Clayton Lee,** named district geologist at Ardmore, Okla.; **Park Ogden, Jr.,** appointed district geologist at Lafayette, La.; and **Charles T. Easley,** named district land man at Lafayette.

J. E. Owens, area geologist for Shell Oil Co. at Tulsa, has been transferred to the company's head-office exploration staff in New York. Owens joined Shell in 1933 as an engineer trainee at Oxford, Kans. In 1941, he was transferred to Wichita Falls, Tex., as production geologist. In 1945, he was appointed division geologist at Wichita

PERSONALS

Falls and 2 years later was named to a similar position in Oklahoma City. He was named area geologist in the Tulsa office in 1949.

Alvin Candela, geologist at Corpus Christi, Tex., with Superior Oil Co. for the past 5 years, has joined the geological staff of Tide Water Associated Oil Co. at Corpus Christi.

Jon Thomas Moss has been promoted to senior research chemical engineer at Magnolia Petroleum Co.'s field laboratories in Dallas. Moss, a graduate of Texas A. & M. College, has been working on the in situ combustion recovery process. He has been with Magnolia's production-research division since 1952.

Daniel F. O'Rourke, president of D. F. O'Rourke Drilling Co., and **James N. McGirl,** former district manager of exploration for Tide Water Associated Oil Co. at Tulsa, have formed O'Rourke - McGirl Drilling Co. with headquarters at Tulsa. O'Rourke is a veteran of the drilling business, and McGirl has been with various companies in the exploration field since joining the old Gypsy Oil Co. in 1922.

Edward N. Leibacher has been elected a vice president of Standard-Vacuum Oil Co. A veteran of 39 years in the oil industry, he has served with Stanvac in the United States, Europe, Sumatra, and Indonesia. He has been a member of the board of directors since 1951.

Wallace W. Mitchell has been promoted to the newly created position of general superintendent of Tide Water Associated Oil Co.'s western pipeline department. Mitchell, who has been in charge of the San Joaquin Valley portion of the company's system since December 1953, will be in charge of 789 miles of crude-oil pipeline, plus four marine terminals. **Duane W. Heeren** has been named chief engineer of the pipeline department. He had been serving as assistant of the San Joaquin Valley system. **William S. Davidson, Jr.,** has been named superintendent of the San Joaquin Valley portion of the line. **Frank E. Coyle** remains in charge of the firm's southern California district, containing 100 miles of line and two marine terminals.

Houston Oil Man Becomes Chief Roughneck

R. E. (Bob) Smith, Houston, receives a plaque and lapel emblem from E. B. Germany, right, president of Lone Star Steel Co., in a ceremony making him chief roughneck for 1955 and an honorary life member of the Roughnecks Club. The presentation was made during an inspection tour by 400 oil men of Lone Star's integrated steel mill at Daingerfield, Tex. The club, sponsored by Lone Star, is dedicated to the recognition of "pioneers of yesterday and today whose perseverance and courage have made our nation the world's leader in petroleum."

A. W. Peake, retired president of Standard Oil Co. (Ind.), has been elected to the board of Kern County Land Co., Bakersfield, Calif.

Ned M. Shelton, former reservoir engineer with Stanolind Oil & Gas Co. at Fort Worth, has been transferred to the Tulsa office as an evaluation engineer.

Chester S. Stackpole, general sales manager of the heating and cooling division of Union Asbestos & Rubber Co., has been appointed managing director of the American Gas Association.

William S. Spangler, general superintendent of Humble Pipe Line Co., has been elected a director of the company. Spangler has been with Humble since 1933. He has been general superintendent since 1951. **Charles E. Shaver,** company attorney, has also been named to the board.

W. R. Reitz has been elected chairman of the board of Quaker State Oil Refining Corp. **S. Messer** was named chairman of the executive committee, and **G. B. Hunter** was named president. Other officers elected were **F. O. Koontz,** vice president; **L. R. Forker,** vice president and secretary; and **C. G. Johnson,** treasurer and assistant secretary.

J. E. Tyree, former assistant district operator with Oklahoma Natural Gas Co. at Oklahoma City, has been promoted to district operating superintendent there.

Olin W. Abraham, former geologist with Sunray Mid-Continent Oil Co., has resigned to join Standard-Vacuum Oil Co. He will be stationed in Indonesia.

Clayton W. Nygaard, former assistant superintendent of the Kansas district of Sohio Petroleum Co., has been transferred to Billings, Mont., as staff assistant to **V. E. Holmes,** Northwest division operations superintendent.

Dr. Max S. Littlefield has been promoted to division chief geologist of the Tulsa production division of Gulf Oil Corp. Littlefield has been employed in the Tulsa division since 1927. A specialist in stratigraphy, he is an authority on carbonate rocks. During his 28 years with Gulf, Littlefield has worked in Oklahoma, Kansas, Michigan, Illinois, Kentucky, New Mexico, Rocky Mountain area, Canada, Veneuzela, Cuba, British Honduras, and Denmark.

PERSONALS

James L. Martin, Jr., former division geologist with Sinclair Oil & Gas Co. at New Orleans, has been promoted to assistant chief geologist and transferred to Tulsa.

Max C. Eastman, vice president in charge of field operations of Reserve Oil & Gas Co., San Francisco, has been elected a director. Eastman succeeds Stanley Pedder, who died recently.

Raymond Horn, Quintana Petroleum Corp., has been elected president of the Petroleum Accountants Society of Houston, succeeding **Virgil L. Smith,** Superior Oil Co. Other new officers are: **W. B. Smith,** General Crude Oil Co., first vice president; **W. S. Warren, Jr.,** Humble Oil & Refining Co., second vice president; and **R. A. Isaacks,** Meredith & Co., secretary-treasurer.

R. Clare Coffin, consulting geologist with Stanolind Oil & Gas Co., has been honored by the U.S. Geological Survey, which has named a new uranium compound after him. The new compound has been named, "Coffinite," in recognition of work he has done in the field of radioactive materials. His Bulletin 16, prepared when he was with the Colorado Geological Survey in Colorado from 1914-1919, has been a major factor in the understanding of the geology of the area.

Harry W. Bass, Dallas independent oil operator and president of the Texas Mid-Continent Oil and Gas Association, has been named as aide to Secretary of the Interior **Douglas McKay** for the Fourth World Petroleum Congress in Rome, June 6-15. McKay is an official United States delegate to the global oil meeting. Other delegates are **E. O. Thompson,** member of the Texas Railroad Commisison, and **Clare Boothe Luce,** American ambassador to Italy.

Jack Cashell, Preston Oil Co., Columbus, Ohio, was elected chairman of the eastern district of the Division of Production of the American Petroleum Institute at its recent spring meeting in Pittsburgh. Vice chairmen elected were **James M. Bird,** Bird Well Surveys, Bradford, Pa.; **Ralph N. Burns,** Chartiers Oil Co., Pittsburgh; **W. B. Maxwell,** United Fuel Gas Co., Charleston, W. Va.; **Richard J. Murdy,** New York State Natural Gas Co., Pittsburgh; **Fred C. Newman,** Old National Bank, Evansville, Ind.; **S. B. Plummer,** Hughes Tool Co., Mount Pleasant, Mich.; **Douglas Rogers, Jr.,** South Penn Oil Co., Bradford, Pa.; and **N. E. Trumbull,** Ohio Fuel Gas Co., Terre Haute, Ind. **Lysle R. Kirk,** Ohio Oil Co., Columbus, was elected district secretary-treasurer. **Paul G. Benedum** was named chairman of the district advisory committee. He was district chairman last year.

M. M. Whitson, assistant superintendent of pipeline for Texas Illinois Natural Gas Pipeline Co., has been promoted to field superintendent of pipelines to succeed **H. E. Smith,** who has retired. Whitson has been with the company since 1931 and was named assistant field superintendent in 1954.

Marvin L. Gosney has been elected chairman of the board of Sinclair Oil Corp. Gosney, who has been executive vice president since 1949, joined the Sinclair organization as treasurer of Sinclair Refining Co. in Chicago in 1917. He was elected a vice president of Sinclair Oil Corp. in 1941 and was named a director in 1942.

R. A. Walters has been named general manager of International Petroleum (Colombia), Ltd., with headquarters at Bogota. Walters began his oil career with Standard Oil Co. of Louisiana in 1936 and transferred to Carter Oil Co. in 1938. Since 1946 he has been with Imperial Oil, Ltd., as division geophysicist, assistant division exploration manager, and since 1949, division exploration manager. **E. C. Borrego,** who has served as general manager and executive representative for the firm in Colombia since 1951, will devote his time to International's interests in affiliated companies in Colombia.

Jack C. Dart, former manager of research and development and member of the board of directors of Houdry Process Corp., has been named manager of the firm's recently established chemical division. **Dr. Alex G. Oblad,** associate manager of research and development, has been named to succeed Dart as manager of the research laboratories at Linwood, Pa. **Ray Cross,** former manager of the Houdry catalyst manufacturing plant at Paulsboro, N. J., was named director of product manufacture of the chemical division. **Howard D. Hartough,** former head of a research section on new petrochemicals and catalysts, was appointed director of product sales and market development of the new division.

George T. Piercy has been appointed general manager of the supply department of Esso Standard Oil Co. Piercy joined the company in 1938 as a process engineer at the Baton Rouge, La., refinery. He was named assistant general manager of the supply department in 1954.

H. D. Pyke, former manager of the West Texas-New Mexico division of Drilling & Exploration Co., has been named manager of the newly formed southeastern division with headquarters at Monroe, La. **Horace P. Goodrich,** former assistant to Pyke at Midland, Tex., has been promoted to succeed him. Other Drilexco changes are **David A. Carnahan,** named chief engineer; **O. G. Barton,** transferred from California to Monroe as drilling superintendent; and **H. J. Stewart,** transferred from Los Angeles to The Hague as assistant to **M. R. Garrison,** manager of Drilvo, Drilexco's European Dutch subsidiary.

DEATHS

A. E. Hurley, retired natural-gasoline manufacturer, died May 23 at his home in Anaheim, Calif. Hurley came to Oklahoma from California in 1920 and formed the Hurley Gasoline Co. in Tulsa. The company operated plants at Kiefer, Drumright, and Red Fork. He retired in 1940.

R. W. Kirkpatrick, 36, of Casper, Wyo., assistant drilling superintendent of Mountain States Drilling Co., Denver, was killed May 18 in an airplane crash in southwestern Wyoming.

Jack Ryan, 73, president of General Refining Co., St. Louis, died there recently.

Peter J. Van Norden, geologist with Socony Mobil Oil Co., Inc., died recently in New York City. A member of the American Association of Petroleum Geologist, Van Norden had been with Socony since 1947.

Miles P. McKeever, 85, retired driller, died recently at his Tulsa home. A native of Butler, Pa., he had resided in Tulsa for more than 40 years.

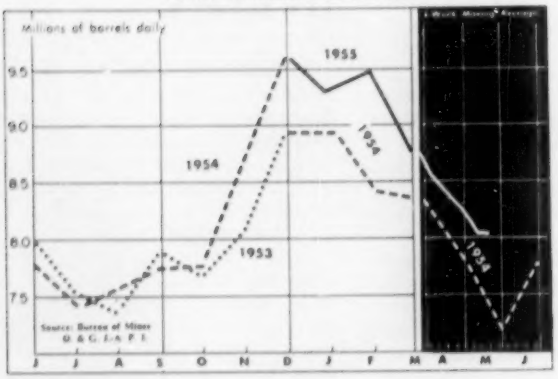
William G. Rothermel, 50, vice president of Maritime Oil Co., died recently in Houston. He and his brother, Louis F. Rothermel, founded Maritime Oil Co., in 1928.

Latest Figures . . . Industry Trends

A QUICK LOOK AT THE HIGHLIGHTS

	LATEST WEEK	Change from WEEK AGO		Change from YEAR AGO	
Production	6,698,075	UP	1,200	UP	212,725
Crude stocks	278,208,000	UP	1,894,000	UP	4,284,000
Completions	1,280	UP	113	UP	208
Refinery runs	7,329,000	UP	268,000	UP	360,000
Gasoline stocks	170,677,000	DOWN	357,000	DOWN	3,845,000
Distillate stocks	76,109,000	UP	3,399,000	UP	7,780,000
Four-product stocks	314,316,000	UP	3,360,000	UP	3,436,000
Total imports	1,047,800	UP	131,200	DOWN	54,300

TOTAL DEMAND—ALL OILS



Timed Cuts in Gasoline Production Influence Early Gasoline Markets

RECENT refinery statistics furnish a clue that may answer the refiners' question about the best time to reduce refinery production of gasoline in the spring of the year.

As the demand for light fuels drops off in March and early April, there is a tendency for refiners to cut middle-distillate production by a shift to higher yields of gasoline as well as by a reduction in crude runs.

The influence of early-season stock reductions on stability of gasoline markets is shown by activities in two major refining and consuming areas during the past 6 weeks.

Gasoline markets have strengthened and prices have advanced in the Mid-Continent and North Central areas. The high-demand area of the upper East Coast has been plagued by gasoline price wars, and the Gulf Coast supply area has had a soft cargo market.

The accompanying table shows gasoline stock changes from April 1 to May 13 of this year as well as changes from a year ago. These changes represent differences between supply and demand for the periods.

For the 6-week period ended May 13, demand for gasoline at Mid-Continent and North Central refineries was 12.7 per cent higher than for the same period last year. Refinery production of gasoline was down 2.0 per cent but the increased demand was supplied from inventories. Gasoline stocks went down 200,000 bbl. daily this year compared with 45,000 bbl. daily in the same period last year. The production cut was early in the period.

Gulf-East Coast gasoline demand was up almost the same or 12.1 per cent, but more of the demand was supplied from production which was up 7.4 per cent. Production was 3 per cent higher in the first 3 weeks than in the last half of the 6-week period.

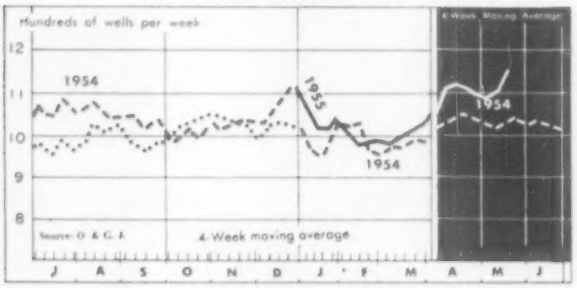
Inland refiners supplied 16.8 per cent of the 6-week gasoline demand from stocks compared with 5.6 per cent from stocks for the Gulf-East Coast area.

GASOLINE STOCKS

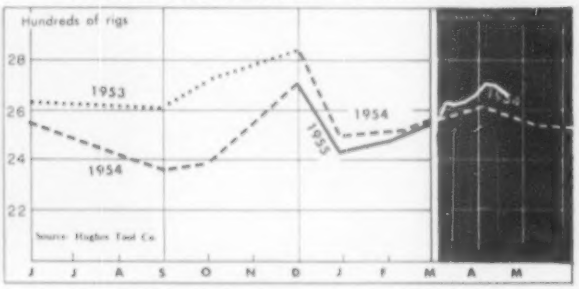
(Thousands of barrels)

	May 13, 1955	Apr. 1, 1955	May 14, 1954	May 13 change from Apr. 1, 1955	May 13 change from May 14, 1954
East Coast	36,781	37,964	36,545	— 1,183	236
Appalachian 1	4,900	4,896	4,418	4	482
Appalachian 2	2,715	2,809	2,661	— 94	54
Ill., Ind., Ky.	36,253	40,935	39,138	— 4,682	—2,885
Okla., Kans., Mo.	16,681	20,380	19,011	— 3,699	—2,330
Inland Texas	6,516	6,848	7,099	— 332	— 583
Texas Gulf Coast	22,959	25,304	23,469	— 2,345	— 510
La. Gulf Coast	10,845	11,198	8,795	— 353	2,050
N. La. and Ark.	3,700	4,661	3,962	— 961	— 262
New Mexico	196	146	193	50	3
Other Rocky Mtn.	7,626	8,545	8,271	— 919	— 645
California	21,962	21,596	22,188	366	— 226
Total U. S.	171,134	185,282	175,750	—14,148	—4,616

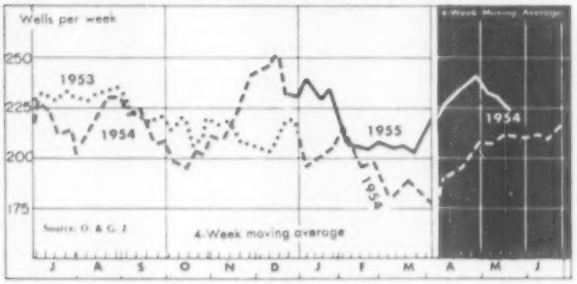
TOTAL COMPLETIONS



ROTARY RIGS OPERATING IN UNITED STATES



WILDCAT COMPLETIONS



ACTIVE ROTARY RIGS*

Area—	5-23-55	Change from 5-16-55	Change from 5-24-54
Gulf Coast	569	—17	12
N. and W. Texas-New Mexico	876	—32	97
Arkansas-N. Louisiana-E. Texas	171	5	—6
Oklahoma	316	—13	—17
Kansas-S. Nebraska	176	—10	28
Illinois-Eastern	162	14	26
Rocky Mountain	232	1	—27
Pacific Coast	151	8	11
Total United States	2,653	—44	124
Western Canada	129	41	18

*Hughes Tool Co.

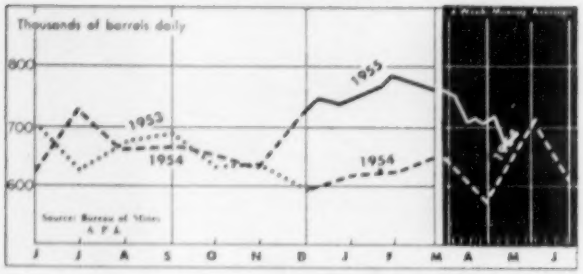
WEEKLY WELL COMPLETIONS . . . WEEK ENDED MAY 21, 1955

	Total of all wells: Comp.	Oil	Gas	Dry	Footage	Cum. 1955	Cum. 1954	Wildcat completions and discoveries: Oil	Dist.	Gas	Dry	Total	Cumulative total, 1955: Oil	Dist.	Gas	Dry	Total
Ala.-Ga.-Fla.	1	0	0	1	4,022	38	41	0	0	0	0	0	0	0	0	36	36
Arkansas	25	17	0	8	75,666	266	230	2	0	0	6	8	15	0	0	68	83
California	58	39	0	19	267,782	1,013	984	1	0	0	15	16	15	0	3	153	171
Colorado	26	8	1	17	165,202	518	493	1	0	1	12	14	19	0	13	258	290
Illinois	85	48	0	37	211,488	1,380	1,040	0	0	0	13	13	25	0	1	215	241
Indiana	9	2	0	7	14,735	273	321	0	0	0	2	2	7	0	0	119	126
Kansas	113	62	14	37	402,773	1,961	1,694	4	0	2	12	18	50	1	16	289	356
Kentucky	30	10	2	18	48,093	475	421	2	0	0	4	6	16	0	5	73	94
Louisiana	103	63	12	28	618,020	1,464	1,217	2	4	0	15	21	44	37	10	148	239
North	60	42	9	9	163,596	761	630	1	0	0	6	7	8	3	1	59	71
South	43	21	3	19	454,424	703	587	1	4	0	9	14	36	34	9	89	168
Michigan	7	4	0	3	15,252	192	214	0	0	0	2	2	5	0	0	73	78
Mississippi	10	1	0	9	64,135	188	139	0	0	0	7	7	4	0	0	68	72
Montana	7	5	0	2	52,677	123	102	0	0	0	2	2	2	0	1	35	38
Nebraska	30	10	0	20	175,354	260	130	0	0	0	8	8	16	0	0	100	116
New Mexico	39	19	13	7	168,015	549	421	1	0	0	5	6	16	1	3	42	62
Northwest	14	1	11	2	49,581	152	125	1	0	0	1	2	2	0	3	12	17
Southeast	25	18	2	5	118,434	397	296	0	0	0	4	4	14	1	0	30	45
North Dakota	0	0	0	0	0	78	90	0	0	0	0	0	0	0	0	12	12
Ohio	19	7	2	10	36,531	408	431	0	0	0	0	0	1	0	2	10	13
Oklahoma	222	133	11	*78	652,712	3,351	3,511	0	0	2	16	18	51	7	16	247	321
Pennsylvania-New York	29	12	5	†12	53,403	653	943	0	0	0	0	0	0	0	5	3	8
Texas	437	273	29	135	1,762,817	7,529	6,978	19	2	6	57	84	289	42	54	1,547	1,932
Southwest (1 & 4)	51	30	4	17	169,586	1,176	971	0	0	1	12	13	38	10	17	299	364
Gulf Coast (2 & 3)	50	17	3	30	339,643	986	999	0	0	1	12	13	33	25	20	244	322
East (5 & 6)	12	6	4	2	63,053	366	359	1	1	0	0	2	12	3	1	113	129
North Central (7-B & 9)	185	125	4	56	565,707	2,696	2,680	12	0	2	24	38	144	0	4	604	752
West (7-C & 8)	111	79	4	28	529,741	1,914	1,610	6	0	0	9	15	59	1	6	279	345
Panhandle (10)	28	16	10	2	95,087	391	359	0	1	2	0	3	3	3	6	8	20
Utah	1	0	0	1	1,650	27	22	0	0	0	0	0	2	0	2	15	19
West Virginia	15	2	12	1	45,938	230	205	0	0	2	0	2	0	0	5	9	14
Wyoming	14	7	0	7	65,406	300	554	1	0	0	3	4	7	0	3	59	69
Miscellaneous	0	0	0	0	0	15	76	0	0	0	0	0	0	0	0	12	12
Total United States	1,280	722	101	457	4,901,671	21,291	20,257	33	6	13	179	231	584	88	139	3,591	4,402
Total previous week	1,167	639	79	449	4,529,014			23	2	6	189	220	551	82	126	3,412	4,171
Total May 22, 1954	1,072	632	51	389	4,430,620			33	5	5	192	235	528	56	126	3,384	4,094
Western Canada	17	11	1	5	63,544												

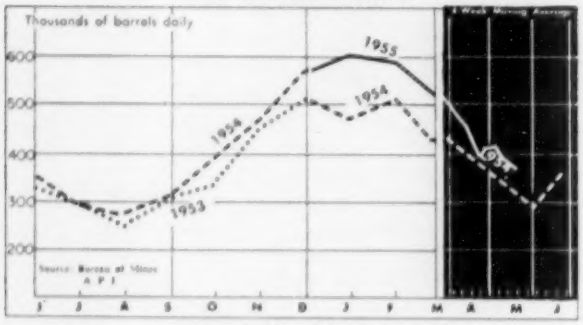
Service wells included: *7, †11.

CURRENT STATISTICS — SUPPLY

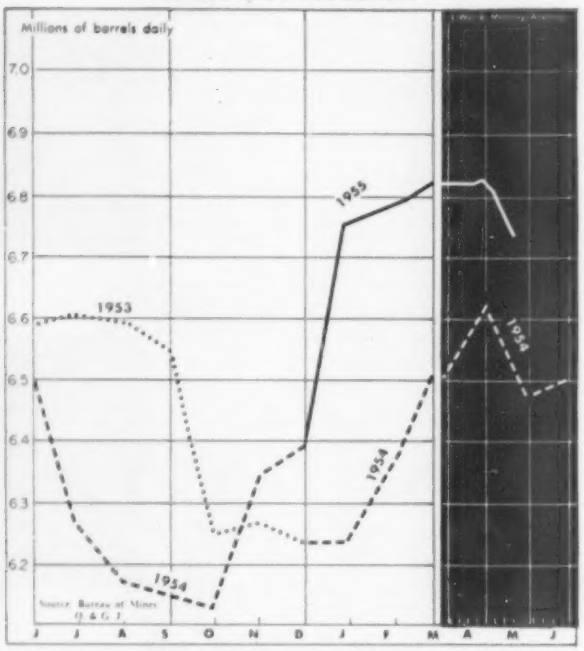
CRUDE IMPORTS



PRODUCT IMPORTS



CRUDE OIL PRODUCTION

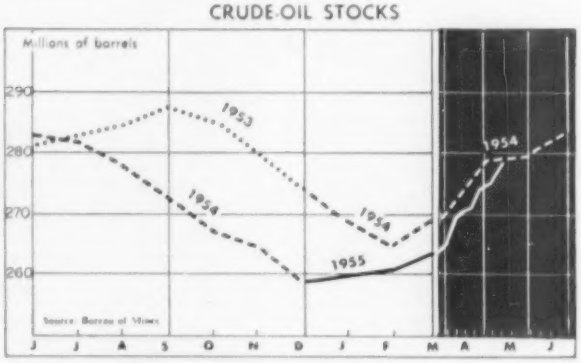


DAILY AVERAGE PRODUCTION FOR WEEK

	May 21			May 14
	Crude oil	Lease condensate	Total	total
Alabama	3,800		3,800	4,000
Arkansas	72,400	450	72,850	75,900
California	977,200		977,200	977,600
Colorado	141,600		141,600	140,500
Eastern	46,500		46,500	46,500
Florida	1,350		1,350	1,350
Illinois	221,800		221,800	222,200
Indiana	28,600		28,600	27,800
Kansas	311,800		311,800	310,600
Kentucky	39,700		39,700	39,300
Louisiana	674,450	529,000	727,350	729,200
North	110,450	2,900	113,350	115,200
South	564,000	50,000	614,000	614,000
Michigan	34,500		34,500	32,100
Mississippi	91,975	4,700	96,675	96,675
Montana	45,600		45,600	44,800
Nebraska	29,700		29,700	29,500
New Mexico	227,500	4,150	231,650	231,750
North Dakota	26,400		26,400	26,900
Oklahoma	555,400		555,400	555,900
Texas	2,761,000	50,300	2,811,300	2,811,300
Dist. 1	53,600	600	54,200	54,200
Dist. 2	139,700	8,200	147,900	147,900
Dist. 3	427,000	22,800	449,800	449,800
Dist. 4	232,500	5,475	237,975	237,975
Dist. 5	45,500	475	45,975	45,975
Dist. 6	118,000	5,450	123,450	123,450
East Texas Field	213,000		213,000	213,000
Dist. 7-B	139,000	50	139,050	139,050
Dist. 7-C	185,400	4,350	189,750	189,750
Dist. 8	912,800	2,000	914,800	914,800
Dist. 9	207,000	775	207,775	207,775
Dist. 10	87,500	125	87,625	87,625
Utah	6,200		6,200	6,200
Wyoming	287,700		287,700	286,400
Others	‡400		‡400	400
Total U. S.	6,585,575	112,500	**6,698,075**	6,696,875
Change from prev. week, up			**1,200**	
Canada	†347,425		†347,425	†305,600
Total U.S. production January 1-May 21				952,453,900 bbl.
Same period last year (crude plus cond.)				*908,067,010 bbl.

*Includes 14,606,125 bbl. condensate. †Week ended previous Monday. ‡S.D. 100, Nev. 300.

CRUDE-OIL STOCKS



CRUDE-OIL STOCKS BY STATES OF ORIGIN*

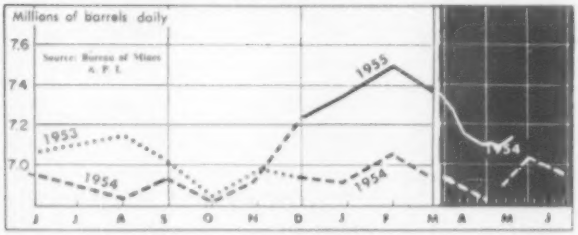
(Thousands of barrels)

	May 14, '55	May 7, '55	May 15, '54
Pennsylvania Grade	2,894	2,876	3,194
Other Appalachian	1,840	1,945	1,876
Illinois, Indiana, Michigan	12,241	11,827	11,598
Nebraska, North Dakota	2,325	2,170	(‡)
Kansas	8,952	8,849	9,761
Oklahoma	24,614	24,907	27,457
Arkansas	2,791	2,841	3,380
Louisiana	16,462	15,740	16,584
North	2,650	2,693	2,535
South	13,812	13,047	14,049
Mississippi	3,019	2,760	3,420
New Mexico	9,013	8,743	7,163
Texas	128,735	128,823	126,969
East Texas proper	10,392	10,569	11,763
West Texas	56,449	54,974	55,608
Texas Gulf	25,951	26,115	27,141
Other Texas	35,943	37,165	32,457
Wyoming	15,735	15,479	14,249
Other Rocky Mountain	5,212	5,261	4,195
California	31,696	32,035	33,456
Foreign	†12,679	12,058	10,622
Total	278,208	276,314	273,924

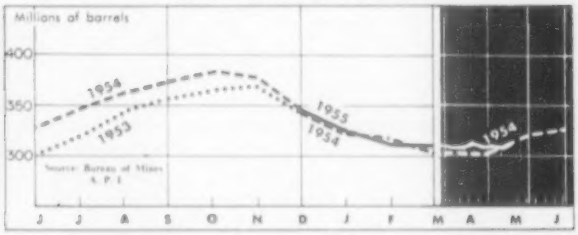
*Bureau of Mines. †Includes 2,867,000 bbl. in California. ‡Included with Kansas.

CURRENT DATA ON RUNS AND PRODUCTION ARE 4-WEEK AVERAGES

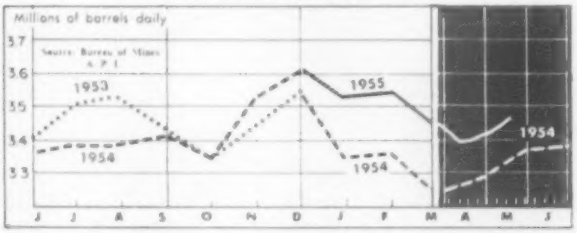
REFINERY RUNS



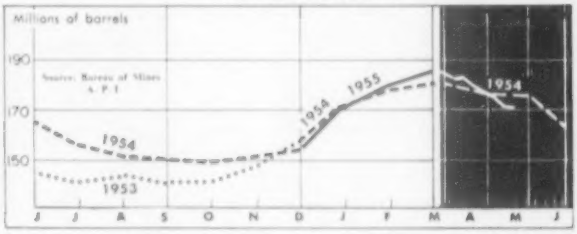
FOUR-PRODUCT STOCKS



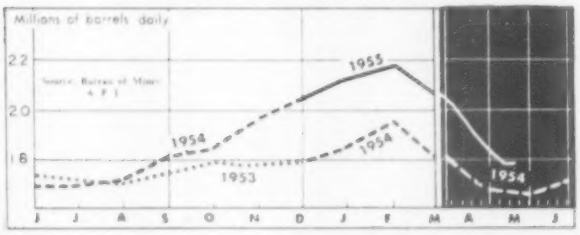
GASOLINE PRODUCTION



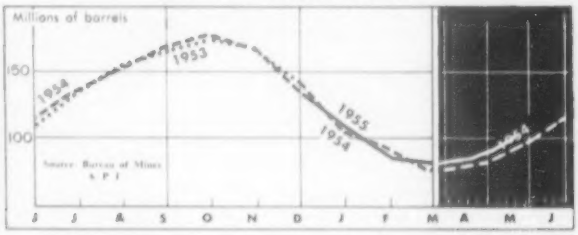
GASOLINE STOCKS



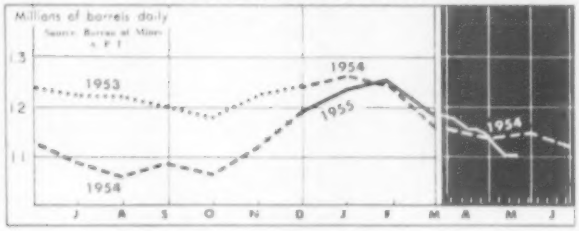
MIDDLE-DISTILLATE PRODUCTION



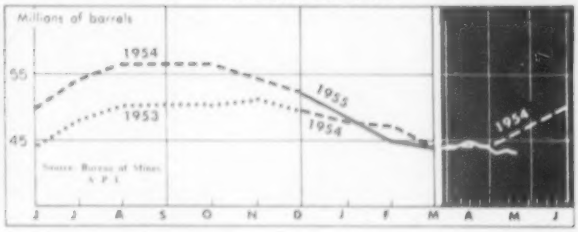
MIDDLE-DISTILLATE STOCKS



RESIDUAL PRODUCTION



RESIDUAL STOCKS



A.P.I. REFINERY REPORT, MAY 20

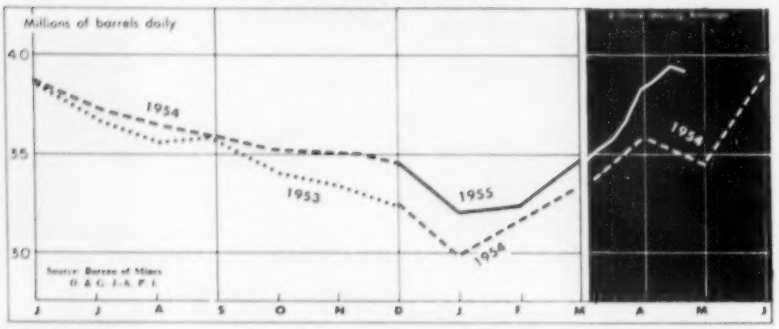
(Thousands of barrels)

District—	Daily avg. runs	Daily average production Gaso.*	Kero.	Dist.	Resid.	Stocks‡ Gaso.†	Kero.	Dist.	Resid.	Bureau of Mines, May 1954 Daily avg. runs	Daily average production Gaso.*	Kero.	Dist.	Resid.
East Coast	1,036	398.0	28.8	237.8	192.0	37,522	10,117	25,102	8,420	1,038	412.8	28.9	216.9	206.7
Appalachian:														
District 1	70	30.4	2.6	14.7	4.0	4,775	494	1,708	357	106	47.2	3.6	22.6	7.8
District 2	101	53.4	3.3	16.0	8.9	2,640	328	599	211	82	48.5	4.2	10.6	10.4
Ind., Ill., Ky.	1,320	672.7	66.4	230.6	159.3	35,434	5,381	14,197	3,695	1,299	658.3	69.0	234.1	161.1
Okla., Kans., Mo.	653	353.9	17.0	162.6	34.1	16,472	1,230	8,686	850	617	334.8	18.3	126.9	43.3
Inland Texas	262	186.5	9.3	43.4	20.7	6,428	397	1,332	1,273	243	177.9	9.6	43.3	26.8
Texas Gulf Coast	1,832	882.7	102.0	427.0	269.0	23,364	2,770	8,348	3,957	1,674	805.9	98.1	345.6	216.3
La. Gulf Coast	660	321.0	56.3	154.1	53.9	10,806	2,020	4,316	1,425	567	281.7	50.4	139.9	46.1
N. La. and Ark.	87	29.4	9.6	17.9	10.9	3,580	922	1,379	67	88	36.0	7.7	20.5	7.3
Rocky Mountain:														
New Mexico	20	11.7	1.0	2.9	2.7	206		83	30	18	11.7	0.4	3.2	2.4
Other Rocky Mtn.	232	108.4	2.3	57.3	33.3	7,535	192	1,946	704	247	115.9	3.5	55.1	34.7
California	1,056	459.3	10.7	143.8	366.1	21,915	293	8,413	22,397	1,059	446.1	7.9	153.3	384.9
May 20, 1955	7,329	3,507.4	309.3	1,508.1	1,154.9	170,677	24,144	76,109	43,386	7,038	3,376.8	301.6	1,372.0	1,147.8
May 13, 1955	7,061	3,488.0	295.7	1,434.3	1,067.1	171,034	22,951	72,710	44,161					
May 21, 1954	6,969	3,336.1	290.0	1,307.6	1,180.1	174,522	22,263	68,329	45,766					

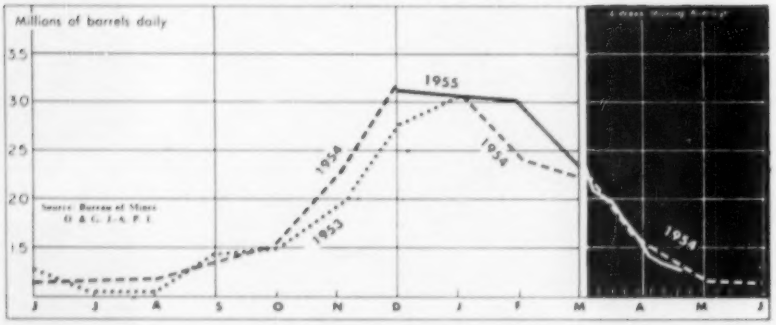
*At refineries including natural blended. †Finished and unfinished. ‡At refineries, bulk terminals, in transit, and in pipelines.

CURRENT STATISTICS — DEMAND

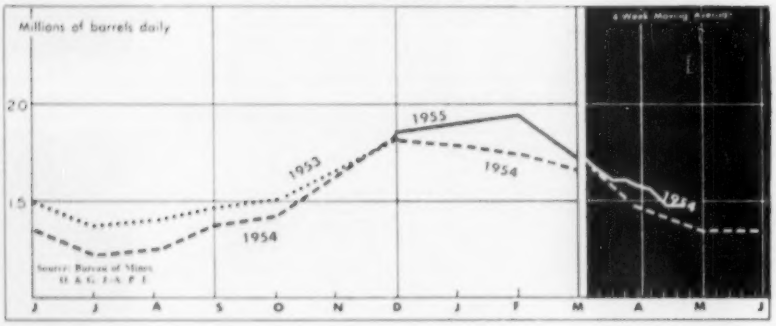
TOTAL GASOLINE DEMAND



TOTAL MIDDLE-DISTILLATE DEMAND



TOTAL RESIDUAL DEMAND



REPRESENTATIVE QUOTATIONS

Spot-market quotations of leading suppliers as of May 25, 1955. Prices are in cents per gallon, except for residual in dollars per barrel and wax in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline	10.75-11.25	11.25-12	10.25-10.75
Premium gasoline	12-12.5	13-13.75	11.50-12
42-44 w.w. kerosine	9.5-9.75	10.05	8.75-9.0
No. 2 straw fuel oil	8.75-9.0	9.3	8.25-8.5
No. 6 residual	$1.65-1.75	$2.35-2.45	$1.95-2.00

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	4.5	4.0	4.25
Grade 18-55	5.4	4.9	5.15

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	18
200 vis., No. 3 neutral, 0-10 pp.	13.25

WAX

Mid-Continent

132-134 A.M.P.	6.0

• Gasoline prices on the Gulf Coast show some signs of firming. Low-octane material is offered more freely than high-octane fuel. Service station price wars in New England have brought tank-wagon prices down almost to level of cargo quotations on the Gulf Coast. Tanker charters indicate increased movement of residual from West Coast to East Coast.

PRODUCTION AND DEMAND—MAJOR PRODUCTS

(Thousands of barrels daily)

	Refinery prod.	Total demand
Gasoline:		
Four weeks ended 5-20-55	3,465	3,910
March 1955	3,460	3,408
April 1954	3,298	3,547
May 1954	3,377	3,463
Middle distillate:		
Four weeks ended 5-20-55	1,781	1,286
March 1955	2,060	2,297
April 1954	1,696	1,592
May 1954	1,674	1,167
Residual fuel:		
Four weeks ended 5-20-55	1,103	1,496
March 1955	1,185	1,749
April 1954	1,141	1,479
May 1954	1,148	1,342

CRUDE PRICES

GRAVITY SCHEDULE

	Signal Hill, Calif.*	Okla-homa, Kansas	Gulf Coast Tex.†	West Tex.‡
14-14.9	$1.87	....	....	....
15-15.9	1.93	....	....	....
16-16.9	1.99	....	....	....
17-17.9	2.05	....	....	....
18-18.9	2.11	....	....	....
19-19.9	2.18	....	....	....
20-20.9	2.24	$2.50	....	$2.37
21-21.9	2.30	2.52	....	2.39
22-22.9	2.37	2.54	....	2.41
23-23.9	2.45	2.56	....	2.43
24-24.9	2.53	2.58	$2.91	2.45
25-25.9	2.61	2.60	2.93	2.47
26-26.9	2.69	2.62	2.95	2.49
27-27.9	2.76	2.64	2.97	2.51
28-28.9	2.83	2.66	2.99	2.53
29-29.9	2.91	2.68	3.01	2.55
30-30.9	2.97	2.70	3.03	2.57
31-31.9	3.04	2.72	3.05	2.59
32-32.9	3.12	2.74	3.07	2.61
33-33.9	....	2.76	3.09	2.63
34-34.9	....	2.78	3.11	2.65
35-35.9	....	2.80	3.13	2.67
36-36.9	....	2.82	3.15	2.69
37-37.9	....	2.84	3.17	2.71
38-38.9	....	2.86	3.19	2.73
39-39.9	....	2.88	3.21	2.75
40 and above	....	2.90	3.23	2.77

*Standard Oil Co. of California. †Upper Texas Gulf Coast. ‡Sour. Includes New Mexico Permian.

Effective dates: California, February 16, 1953; east of California, June 15, 1953; Pennsylvania Grade, January 21, 1955.

FLAT CRUDE PRICES

Representative posted schedules per barrel.

Louisiana:	
Cotton Valley (distillate)	$3.00
Cotton Valley (Holloway crude)	2.95
Texas:	
East Texas	2.90
Chapel Hill	2.83
Conroe	3.13
Van	2.73
Pennsylvania Grade:	
Bradford	3.50
Middle District	3.37
Southwest Pennsylvania	3.08
West Virginia	2.97
Buckeye Grade	2.91
Zanesville Grade	2.72
Illinois Basin	2.90

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FOR SALE EQUIPMENT

FOR SALE: ENGINE—165 Hp. Climax Model R51, maximum continuous Hp. rating 126. Herndon Drilling Company, 421 Mayo Building, Tulsa. Phone 4-9700.

8⅝ PIPE 28.55# with collar & P.E. $1.00; also 25 miles of P.E. beveled Rg 3. Ten miles 6⅝ P.E. 19# 75 Cents. R. L. Griffin, Box 2373, Phone 50-0648, Tulsa.

FOR SALE: Surplus Walworth LimiTorque Motor Control Valves, 4" thru 18". Details furnished on request. Write, wire or phone Purchasing Agent, Texas City Refining, Inc., P. O. Box 1271, Texas City, Texas. Ph. 5-4451.

FOR SALE: 1—Beaird—Ingersoll-Rand packaged Compressor Plant, Type 6-JVG (165 H.P.) Heavy Duty, direct connected, 4-cycle, gas engine driven, single stage equipped with 3—4¼ x 9 compressor cylinders, three hand operated fixed volume pockets, two hand operated valve lifters, 20" O.D. 500# W.P. intake scrubber, air starting equipment and controls for automatic operation. Designed for intake pressure range 100#-250#, discharge pressure range 500#-600#. Delivery 3,480 MCF per day at 250# intake, 550# discharge. This plant has been in use less than 30 days and is located near Palestine, Texas. Box H-616, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE

1 Caterpillar generator, A.C., 15 K.W.
1 Century generator, D.C., 10 K.W.
1 General Electric generator, D.C., 10 K.W.
1 Westinghouse, D.C., 10 K.W., generator.
1 Kohler electric plant, D.C., 1½ K.W., 4 cylinder.
1 Kohler electric plant, D.C., 5 K.W., 4 cylinder.
1 Kohler electric plant, 5 K.W., Waukesha motor, F.C.-140.

All in excellent condition, may be seen at Makin Yard, Hobbs, New Mexico, or call 3-4062 or 3-3141.

MAKIN DRILLING COMPANY
P. O. BOX 1628
HOBBS, NEW MEXICO

USED EQUIPMENT

#527—Franks Model 44-TM, Single Drum, Truck Mounted Servicing Unit, 8x10x50' Single Pole Mast, Mounted on FWD Truck.

#536—Franks Model E.T. Single Drum Servicing Unit, 8x10x62' Single Pole Mast, Mounted on 1941 KS-F International Truck.

#526—Franks Super East Texas Double Clutch, Single Drum, Mounted upon KS-11 International Truck. No Mast.

#541—Franks Model ET Single Drum with 8x10x62-ft. Mast, Mounted upon 1948 Model K8 International Truck.

#517—Type 3 O.C.S. Servicing Unit mounted on 1942 Mack Truck. Located Odessa, Texas.

#525—50/60 Ideco Skid Servicing Unit. Double Pole Mast. Mounted on International Tandem Truck.

#533—Cardwell KL Double Drum Spudder with 60 ft. derrick.

Write, Wire or Call

FRANKS MFG. CORPORATION
SUBSIDIARY OF CABOT SHOPS, INC.
BOX 3218, WHITTIER STATION
TULSA, OKLAHOMA

FOR SALE EQUIPMENT

CORE DRILLS, SPUDDERS, ROTARIES: New and used equipment. Everything in supplies. Fishing tools rented. Pressey & Son, Pueblo, Colo.

SALES AND RENTALS. Used cable drilling and fishing tools, casing, production equipment; from the Southwest's largest stock of oil field supplies. Degen Pipe and Supply, Tulsa.

FOR SALE—36-L Bucyrus-Erie Spudder trailer mounted, Casing tackle strut, tool crane, New LO-25 Buda Engine, extra starter, generators, magneto, and sand reel to fit this machine. Write or call The Buckeye Supply Co., P. O. Box 1231, Zanesville, Ohio, Telephone 2-3641.

FOR SALE OR DEAL

Three rebuilt Type 80 Cooper Gas Engine Driven Compressors. Cylinders to suit. Two as is. Compressor cylinders all sizes.

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Tel. 2-5473.

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Mr. Aircraft Owner: Take advantage of our extra special service and vast inventories of Parts, ENGINES, PROPELLERS, TIRES and Supplies. Domestic and Foreign shipments. C A A approved repair station No. 3846.
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Dept. L, Box 5306 T A
Denver 17, Colo.

REFINERY EQUIPMENT

BOILERS: 200 H.P. 200 lb. W.P. Water tube with fittings—$3,000.00; Three 80 H.P.—H.R.T.—150 lb. $500.00 each; Oilfield Type 100 H.P. 150 lb.—$500.00.
TOWERS: Fractionator 48"x74', price $1,500.00; Fractionator 48"x24', price $1,000.00; Vacuum Tower 48"x24', price $750.00.
HEATERS: Two 5,000 bbl. per day, 7,500,000 B.T.U. crude oil, price $1,500.00 each.
TANKS: 1,000 bbl. Agitator, price $1,500.00. Accumulators of various sizes—$50.00 each.
STILL TUBES: 4" Sched. 80—1¼% cr. ½ M—Spec. A-234; WP-11—50 pcs. New. 20' long, price $381.83 CFT.

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12354 Lakeland Road
Santa Fe Springs, California
RAymond 3-3357

GASOLINE PLANT *FOR SALE*

Gasoline Plant, located in Brazoria County, Texas, shut down in January, 1954. Had been processing approximately thirty-three million feet of gas daily with absorber pressure approximately six hundred thirty pounds. Plant recovered Propane, Butane, Gasoline, Kerosene and Diesel Oil. Detailed inventory available upon request.

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FOR SALE EQUIPMENT

FOR SALE—Horizontal Duplex Steam Pumps—10x8½x12—353 GPM—bronze fitted—max. discharge pressure 100 lbs.—6" suction—5" discharge—mfg. by American Marsh Co. Quantity available—NEW—Boston Metals Co. 313 E. Baltimore St., Baltimore 2, Md., Curtis 7-5050.

Gaso Duplex 4½" x 6" Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units, Westinghouse 20-25-50 KW Generating Units.

H. H. COFFIELD
Attn.: W. H. ORR
Phones: 132—Rockdale, Texas
AT-3427—Houston, Texas

LIQUIDATION

5—600 HP IR Type KVG Gas Engine Driven 2 Stage Compressors (1942).

1—660 HP IR Type KVG Gas Engine Driven 2 Stage Compressor (1952).

$50,000 New Spare Parts for Above.

2—IR Starting Air Compressors, Model 25c, Type 40, 265#, 67.6 cfm.

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TOWERS: 6'x58' chrome-lined (1951) 6'6"x65', 6'x27', 5'x27', 42"x49', 30"x38'.
HEAT EXCHANGERS: (2) 800 sq. ft. (675# 800° F.) Steel.
VESSELS: 3'10"x38', 325#, 950° F.; 5'3"x38'6" (90# 845° F.) chrome lined.
PUMPS: BJ5-St. ni.-chr. pump, 2100' hd., 400 gpm.; IR 15x7x14 steam driven comp.
MISCELL.: Steel, chrome, pipe, valves and fittings, etc. NEW.

AT OTHER LOCATIONS

10—1500, 1000, 430, 360 sq. ft. Steel Ht. Exchangers.
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3—RA-8, MA-4 Clark Gas Engines.
6—325# Vessels 10'x35', 7'x30', 4'x40'.
3—150# Vessels, 10'x20', 8'x16', 6'x20'.
4—Centrifugal Pumps, 2000 gpm. 90' hd., 60 gpm. 460' hd., motor and turb. driven.

ATMOSPHERIC HEAT EXCHANGERS

8—715 sq. ft., 850 psig, 550° F., S.S.
6—470 sq. ft. 850 psig, 550° F., S.S.
13—715 sq. ft. 125 psig, 300° F. S.S.
6—715 sq. ft. Admiralty 125 psig, 300° F.

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FOR SALE—24-L Bucyrus-Erie Spudder, Serial No. 100471, in perfect condition and with casing tackle strut. Write or call The Buckeye Supply Co., P. O. Box 1231, Zanesville, Ohio, Telephone 2-3641.

GARDNER-DENVER FXD 7½"x10" Mud Pump unitized with engine. Skid mounted. General Tool & Supply Co., Box 4387, Oklahoma City, Okla.

WILSON SUPER—Cleanest small rotary in Oklahoma. New 1953. Stands doubles. New drawworks engine. Nearly new 10" Gaso mud pump. 3000' good 3½" drill pipe. Complete every way. Drills to 3700 feet easily. Bargain $40,000.00. Box H-829, The Oil and Gas Journal, Tulsa, Oklahoma.

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100 HP Directed connected Clark two stage Compressor. Actual delivery 250M feet per hour, 3,000M per day at 800 pounds pressure. Not in use very long period of time. Being skid mounted and modernized for reasonably priced Air drilling. Selling price cheap for purposes created.

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GAS METERS: Westcott and Foxboro Orifice Meters and Controllers. Bristol and Taylor Recording Pressure Gauges. GEO. R. MILNER, P. O. Box 124, OKMULGEE, OKLAHOMA.

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THREE #12 Sweetland Filters, 48 bronze leaves, monel covered on 3" C.C., now located in southwest, available for inspection. 11 Sperry 18" x 18" cast iron Filter presses. 11 chambers. Consolidated Products Co. Inc. #65 Garden Street, Hoboken, N. J. N. Y. Tel.: BArclay 7-0600.

FOR SALE—28-L Bucyrus-Erie Spudder, trailer mounted, casing tackle strut. Serial No. 101306. Write or call The Buckeye Supply Co., P. O. Box 1231, Zanesville, Ohio, Telephone 2-3641.

FOR SALE: Medium and small rotary rigs ready to work, priced right for sale. For further information contact Box H-778, The Oil and Gas Journal, Tulsa, Oklahoma.

PIPE LINE PIGS AT DISCOUNT. One WILLIAMSON Type RCN-50-8" new. One used on one run only. Make us an offer. DALLAS MFG. & SALES COMPANY, P. O. Box 7181, Dallas, Texas.

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REED CORE KINGS
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Sizes from 5⅞" to 8½" both Hard and Soft formations for K-500 to K-675 barrels, complete with K-36A 2 piece Core Catcher.

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MODEL S-43 Walker-Neer Spudder Serial #1485. NEW—Never been set up—Sell at discount. Write P. O. Box 127, Lovington, New Mexico. Phones 8533 or 3791.

FOR SALE: Two Byron Jackson used 3" x 9"—Ten Stage Hot Oil Pumps with steam turbines, outer case forged steel, inner case nickel cast iron. One used 16" x 3" x 18" National Transit Duplex end packed FS Fluid End Pump, with cast semi-steel water cooled plungers. Details furnished on request. O. G. Jackson, Purchasing Agent. The El Dorado Refining Company, El Dorado, Kansas.

COMPLETE NATIONAL 50 Drilling Rig Operating West Texas. Not priced at a sacrifice, but excellent terms available to responsible company or individual. Would consider leasing with option to purchase. Box H-824, The Oil and Gas Journal, Tulsa, Oklahoma.

USED ROTARY EQUIPMENT. Complete rigs, three to ten thousand feet. Used engines, Cats, Murphys, General Motors, Waukeshas, Budas. Slush pumps, draw works (extra fine U-15), hooks, blocks, tables, etc. Write or call Ike Ridenhour, 1758 N. Bluff, Wichita, Kansas. Phone Murray 4-3596.

275 JOY, truck mounted, 5 x 8 Gardner-Denver pump, 2 L-525 Buda engines, rotary table, hydraulic pulldown, 48 ft. derrick, rated 3,000 ft. capacity. Priced for quick sale. Ainsworth, Inc., 1002 Union National Bank Bldg., Wichita, Kansas, Forest 3-3785.

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Large quantity of used, standard line pipe for sale. Because material must be moved quickly, will sell at the following bargain prices: 2" @ 5c per foot; 3" @ 11c per foot; 4" @ 14c per foot; 8" @ 45c per foot. If interested, call, write, or wire to The Tri-State Pipe Company, Bellaire, Ohio, Telephone—42.

WILSON MOGUL double drum rig with 145 GKU Waukesha, 87' mast pole, 6' high 30' long substructure, 12" Brewster rotary, tool house, water tank, 5" x 10" slush pump with engine, tongs, slips, generating set, shale shaker, complete with all hand tools. Three (3) years old, $25,000.00. Stored at Odessa. Norvell-Wilder Supply Company, Box 2178, Houston, AT-3471.

BUCYRUS-ERIE Spudder—36 L. Buda engine, butane equipped. Auxiliary leg. Tools from 15½" to 5". Completely equipped and ready to drill. Inventory furnished upon request. Robert J. Orr, 1928 Crestview Dr., Bartlesville, Okla. Phone 5427.

2—200 H.P. CLARK direct driven compressors less compressor cylinders $2000.00 each. 1 Do with 8½" and 10" compressor cylinders $3250.00. Located near Kilgore, Texas. Nolan Sales Corp. Tulsa, Okla.

JOY 37 mounted on 1950 F6 Ford, 4½ x 6 Gardner-Denver pump, hydraulic pulldown. Failing automatic chucks, 30 ft. derrick, with drill pipe, water truck and other equipment. For inventory and price contact Ainsworth, Inc., 1002 Union National Bank Bldg., Wichita, Kansas, Forest 3-3785.

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FOR SALE: 2—55 M bbl. fabricated shells with structures. 2—55 M bbl. dismantled not fabricated complete less bottoms. Can furnish new bottoms or roofs re-erected. S. Skeen Staley, Jr. 3530 Singleton Blvd., Phone FD-2-6643. Dallas.

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WANTED USED BOILER TUBES

3¼"—3½"—4"
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Also all sizes of Good used Standard black pipe from 2" to 16".

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- **AUXILIARY EQUIPMENT:** Heat Exchangers—Pumps—Engines—Compressors—Metering & Control Equipment—Piping Boiler Plant—Steel Buildings—(37) Welded Storage Tanks from 300 to 35,000 bbl. capacity.

TO BE SOLD AT A FRACTION OF ITS REPLACEMENT COST

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PIPE THREADING MACHINES. Landis must have receding Chaser Dye Heads. 2 only $8\frac{5}{8}$" OD. 1 only $13\frac{3}{8}$" OD. Please phone model and Head numbers when you phone or write us. VALLEY STEEL PRODUCTS CO., Box 257, Phone 686, Flora, Illinois.

IMMEDIATE OPENING for graduate engineer desiring sales work. Home office location, Tulsa, Oklahoma. Give complete resume of experience, references, and salary expected in first reply. Box H-803, The Oil and Gas Journal, Tulsa, Oklahoma.

ELECTRICAL INSPECTOR

Electrical engineering degree required, plus minimum 4 years experience shop inspection, or shop supervision & testing, of oil refinery electrical equipment such as switch gears, transformers, motor starter protection & minimum 4 years field supervision on installation of such equipment. Electrical design & specification writing preferred.

Please apply only if age 30 or above and providing you possess the required qualifications & experience. Interviews arranged at our expense on basis of confidential complete chronological resume, including education and employment (names & addresses of employers, dates employed, positions held & your specific duties & scope of responsibility, salaries received, location & type of jobs, etc.). Airmail data to

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FOREIGN EMPLOYMENT. List of oil companies and drilling contractors showing where to apply for foreign jobs. OIML Co., Box 2603, Tulsa, Okla. $5.00 cash.

GEOLOGIST of outstanding ability, under 35, with at least 3 years' experience in northern Louisiana, gulf coast and west Texas areas. Exploration and development experience essential for Dallas office of established independent oil concern. P. O. Box 2775, Dallas, Texas.

SOUTH AMERICA. Major Oil Company. Our fee paid. Mechanical Engineer - Petroleum Engineer, Producing or Drilling - Chemical Engineer - Geologist (must be single)—All requiring Degree, experienced or inexperienced. Mud Technician - two or more years' experience, single. Tool Pusher, three years experience. Foreman Pump Station, three to five years experience. On all jobs age limit is 40. All information confidential. Contact CHAS. J. LOVELESS PERSONNEL SERVICE, 616 S. Main, Tulsa, Oklahoma—Phone 4-3193.

Experienced Reservoir Engineer

Anderson-Prichard has an opening in their Oklahoma City office for an engineer having a minimum of two years experience in reservoir work. Applicant should write giving personal history, a brief resume of education and professional experience and salary expected. All applications will be confidential.

Please address Anderson-Prichard Oil Corporation, Liberty Bank Building, Oklahoma City, Oklahoma, Attention: Mr. D. F. Tver, Industrial Relations Department.

HELP WANTED

RESERVE ENGINEER: Degree in Petroleum Engineering or Geology. Location—St. Louis, Missouri. State age, salary, references and general qualifications. Box H-827, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEER OR CHEMIST—With petroleum refinery experience for a position in sales to the petroleum industry. Familiarity with fluid catalytic cracking processes desirable. Please reply stating age, qualifications and salary requirements. Box H-833, The Oil and Gas Journal, Tulsa, Oklahoma.

CHEMICAL ENGINEER with at least two years Refinery or Petrochemical experience for position in Research and Development Department located in Tulsa. State qualifications and salary expected. Write Personnel Director, Post Office Box 381, Tulsa, Oklahoma.

GENERAL MANAGER for integrated oil company in South America. Prefer geological or petroleum engineering background with college degree and experience. Must also be a capable administrator and supervisor. Salary commensurate with experience and qualifications. Send detailed personal history and work experience to Box H-795, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER OR GEOLOGIST

with broad general knowledge of the petroleum industry in East Texas, North Louisiana and South Arkansas to fill position with well established firm in area. State qualifications in detail.

Box H-705, The Oil and Gas Journal, Tulsa, Oklahoma.

CHEMICAL ENGINEER

Houston Refinery has opening for Chemical Engineer with minimum five years experience in petroleum refinery or related field, including three years process design work. Salary open.

Send complete resume to

P. O. Box 5008,

HARRISBURG STATION,

HOUSTON 12, TEXAS.

OVERSEAS OPPORTUNITIES

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located in South America need . . .

PETROLEUM ENGINEERS:

Vacancies include drilling, production, equipment engineering, and/or reservoir studies.

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Will be required to inspect oil refinery equipment and request equipment renewals where corrosion, failure, or defectiveness under safety code makes necessary.

CHEMICAL ENGINEERS:

Refinery process engineering assignments include design, control, economic studies and/or scheduling of operating programs.

QUALIFICATIONS: Age 25 - 38, engineering degree and several years professional experience in oil industry. Consideration can be given to United States citizens only.

★ ★ ★

These are regular staff positions offering liberal salary and benefit plans.

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WRITE, giving complete address, age, marital status, education and details of past experience.

Box 308-O, Radio City Station, New York 19, N. Y.

PETROLEUM ENGINEERS

Major oil company has openings for graduate Petroleum Engineers in its operations in Venezuela. 1½ to 4 years experience required. Salary commensurate with experience. Liberal company benefit plans. Send complete resume of work experience to

Box H-724
The Oil and Gas Journal
Tulsa, Oklahoma

PROCESS ENGINEERS

Openings for Chemical Engineering Graduates with minimum 3 years experience in Process Plant Design. Work involves project engineering, equipment application and selection, translation of process data into new plant design. Applicant should be well grounded in thermodynamics, unit operations, and equipment specifications. The work is interesting, salary and opportunities are attractive; location in Texas. Mail resume to

Box H-820,
The Oil and Gas Journal,
Tulsa, Oklahoma.

HELP WANTED

MAINTENANCE AND CONSTRUCTION SUPERVISOR

for expanding independent refinery in Upper Midwest. 5 or more years refinery or process plant experience required. Challenging opportunity for qualified man. Write giving full particulars.

Box H-931, The Oil and Gas Journal, Tulsa, Oklahoma.

Management Position Open

Important managerial position with opportunity for further advancement is open in large integrated oil company with operations in Mid-Continent-Rocky Mountain area. Annual salary commensurate with ability and experience will exceed $25,000. Geological experience and training desirable. Applicant should supply complete resume of experience and qualifications which will be treated confidentially.

Box H-808, The Oil and Gas Journal, Tulsa, Oklahoma.

STAFFING NEW OIL REFINERY

COMMONWEALTH OIL REFINING CO. INC.

Building complete new refinery near

PONCE, PUERTO RICO

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Experienced Refinery Personnel

Operating Superintendent
Foremen, Stillmen, Operators
Instrument Supervisor, Senior Chemist

Crude Distillation, Houdriflow Cat Cracking, Cat Reforming, Cat Poly, Alkylation, Gas Recovery, Light Oil Treating

Write, giving complete resume to

Commonwealth Oil Refining Co. Inc.

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New York 17, N. Y.

INSPECTOR

PETROLEUM REFINERY

SANTOS, BRAZIL

Mechanical Engineering degree preferred, but not mandatory. Applicant must possess extensive experience in:

a) refinery inspection procedures and maintenance.
b) maintenance all types refinery equipment including vessels, towers, drums, exchangers, pumps, compressors and piping.
c) erosion and corrosion tests and pressure tests under all applicable codes.
d) preventive maintenance, with ability to determine safe working life above equipment, and ability to determine replacements as required with view to minimize shutdowns without sacrificing safety or efficiency, plus ability to determine extent of maintenance required during turnarounds.

This new 45,000 bpd refinery consists of crude topping, visbreaking, naphtha, gas cracking, cat poly, gas recovery, edeleanu, gasoline blending and treating units for gasoline, diesel oil and kerosene.

Challenging opportunity. Excellent base salary plus living allowance and production bonus. Family transported to Brazil at our expense.

Interviews arranged at our expense on basis of confidential complete chronological resume, including education and employment (names and addresses of employers, dates employed, positions held and specific duties and scope of responsibility, salaries received, location and type of jobs, etc.). Airmail data to

PERSONNEL DEPARTMENT

HYDROCARBON RESEARCH, INC.

115 Broadway New York 6, N. Y.

HELP WANTED

HELP WANTED

THE STANDARD OIL COMPANY (OHIO)

Manufacturing (Refining) Department

is looking for

CHEMICAL ENGINEERS, CHEMISTS, and MECHANICAL ENGINEERS

with one to five years experience in petroleum refining or related activities

for staff work primarily in Cleveland, Ohio.

Possible employment in Toledo, Lima, or Cincinnati, also.

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CHEMICAL ENGINEERS: B.S. or higher degree and experience in development, pilot plant operation, process design, process trouble shooting, refinery process engineering, economic studies, or related work background.

CHEMISTS: B.S. or higher degree and experience in product and process research or development.

MECHANICAL ENGINEERS: B.S. or M.S. degree and experience in process equipment construction, design, inspection, or maintenance, petroleum product testing and field evaluation, or related work background.

Age Range 22 - 32

Salaries commensurate with experience and level in organization. Advance on merit basis.

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WANTED: Junior Petroleum Reservoir Engineer having 2 or 3 years experience. Location of employment, Tulsa, Oklahoma. Give qualifications, references and salary expected in first reply. Our employees are aware of this ad. All replies will be held confidential. Box H-785, The Oil and Gas Journal, Tulsa, Oklahoma.

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Work will include: Estimating, Project Engineering and Coordination, Pipe and Vessel Design, and Field Engineering and Supervision. Projects are varied and interesting.

Preferred background:
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A man who can grow with the company will receive preference. Replies will be kept confidential.

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P. O. BOX 2132,

HOUSTON 1, TEXAS

EXCEPTIONAL OPPORTUNITY for Graduate Petroleum Engineer, under 25, with Independent Oil Company. Should have at least three years' experience in the gulf coast, northern Louisiana, and West Texas areas. Must be outstanding in work-over analysis, economic evaluation, reserve calculations, electric analysis interpretation and reservoir studies. P. O. Box 2775, Dallas, Texas.

EQUIPMENT WANTED: Cardwell or other slim hole outfit for ten thousand foot work. With or without engines. Appliances and tools in good condition. No drill pipe. Give location and price. Oil Well (Seventeen) drilling unit, with or without engine. Price and location. Heavy spudder for seven thousand foot work. With or without tools. Give location and price. Box H-817, The Oil and Gas Journal, Tulsa, Oklahoma.

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WANT TO BUY settled oil production by independent operator direct from the producer. No deals too small or too large. P. O. Box 77, Lafayette, La. Dudley J. LeBlanc

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PROCESS ENGINEER, 30, family, 8 years thorough exceptionally, diversified process control engineering and supervision at two of world's largest refineries. Currently in South America. Will locate responsible organization desirable area USA or elsewhere if unusual challenging situation. Box H-813, The Oil and Gas Journal, Tulsa, Oklahoma.

GRADUATE Petroleum Engineer with sixteen years experience in engineering, drilling and production for major and independent operators desires connection with active independent. Box H-806, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER presently employed in supervisory position major company desires opportunity in operational-management field. Broad experience includes 9 years production, 4 years construction, and 4 years seismograph operation. Age 41, excellent references. Box H-797, The Oil and Gas Journal, Tulsa, Oklahoma.

SUBSURFACE GEOLOGIST, single, 29, 4½ years broad experience, now with Major in South, desires position in Denver area. Box H-812, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGICAL ENGINEER, 29, M.S. Geology, B.S. Mechanical Engineering (Petroleum Production Option). 4 years Geological and Production Experience with Major Company in Kansas and Oklahoma. Desire Position with Independent. Box H-755, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOPHYSICAL SUPERVISOR, 35, graduate, 13 years major company experience in Colombia and Venezuela. Employed. Desires foreign employment with chance for advancement. Prefers major company work in Middle East or Africa. Box H-794, The Oil and Gas Journal, Tulsa, Oklahoma.

DISTRICT GEOLOGIST desires position with independent operator or company on interest basis. Thoroughly qualified in all phases exploration, drilling, producing and leasing deals. Nine years subsurface experience Central and W. Texas and SE N. Mexico with major and small companies. Age 35. Now located W. Texas. Box H-822, The Oil and Gas Journal, Tulsa, Oklahoma.

REFINERY Operations Supervisor, over 13 years refinery experience, 8 years foreman, cat cracker, etc. Box H-818, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM GEOLOGIST, open to represent Financial Investors in oil exploration activity. Services in exchange for operating expenses plus carried interest in effective projects. Post Office Box 1884, Tulsa, Oklahoma.

EXPLORATION GEOLOGIST, 31, family, seeks challenging affiliation with oil-mining concern, 10 years experience, past three as independent, remainder with majors, graduate Colorado Mines, prefer nominal salary plus interest or stock option. Box H-830, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST: 33, M.S. plus, excellent record. 10 years experience, Gulf Coast-Northern Basin; 5 years major, 5 years chief geologist independent, thoroughly experienced. Desires permanent position with advancement opportunities, major or independent, domestic or foreign. Box H-825, The Oil and Gas Journal, Tulsa, Oklahoma.

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PIPELINES ANNOUNCED: Projected pipelines indicate increasing action in central Williston Basin, where we specialize in royalties in major company blocks. For informative material, write LANDOWNERS ROYALTIES COMPANY, Box 1225, Great Falls, Mont.

JACK EAGLE, Oil Properties, 706 City Nat'l. Bldg., Oklahoma City, Oklahoma, Telephone REgent 6-7027.

LEASE AND DRILLING BLOCKS

CONTACT A. L. Bowles, Box 947, Ada, Okla., for Drilling Deals, Oil Investments.

TULSA INDEPENDENT wants lease or drilling deal, Illinois area, with good geology. Box H-832, The Oil and Gas Journal, Tulsa, Oklahoma.

LOCATION KANSAS—200 acre lease, 4 producing wells, 3—100 bbl. tanks, equipment new, will drill two additional wells, all for $17,500. Box 114, Erie, Kansas.

KANSAS WATER FLOOD
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Tulsa, Oklahoma

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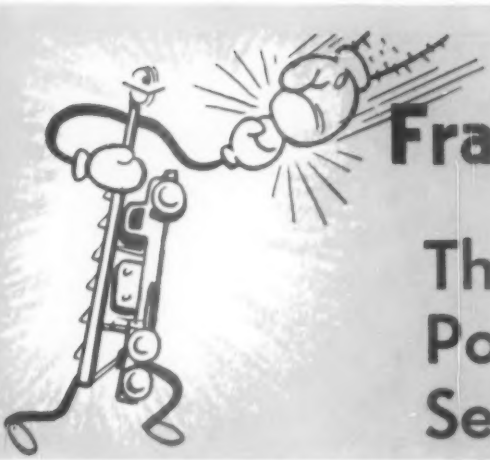

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Franks Cruiser, the most widely accepted pole mast servicing unit, has set a standard of performance and economy for rod and tubing jobs.

Called the "Tuffy", because of its ruggedness and dependability, the Cruiser is especially economical in areas where there is considerable waiting time on such operations as swabbing.

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- ★ **New special hard brake flanges**
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- ★ **Available in single or double pole masts and single or double drum drawworks.**

Franks Cruiser owned by McDonald Streetman Well Service Co., Seminole, Oklahoma contractors.

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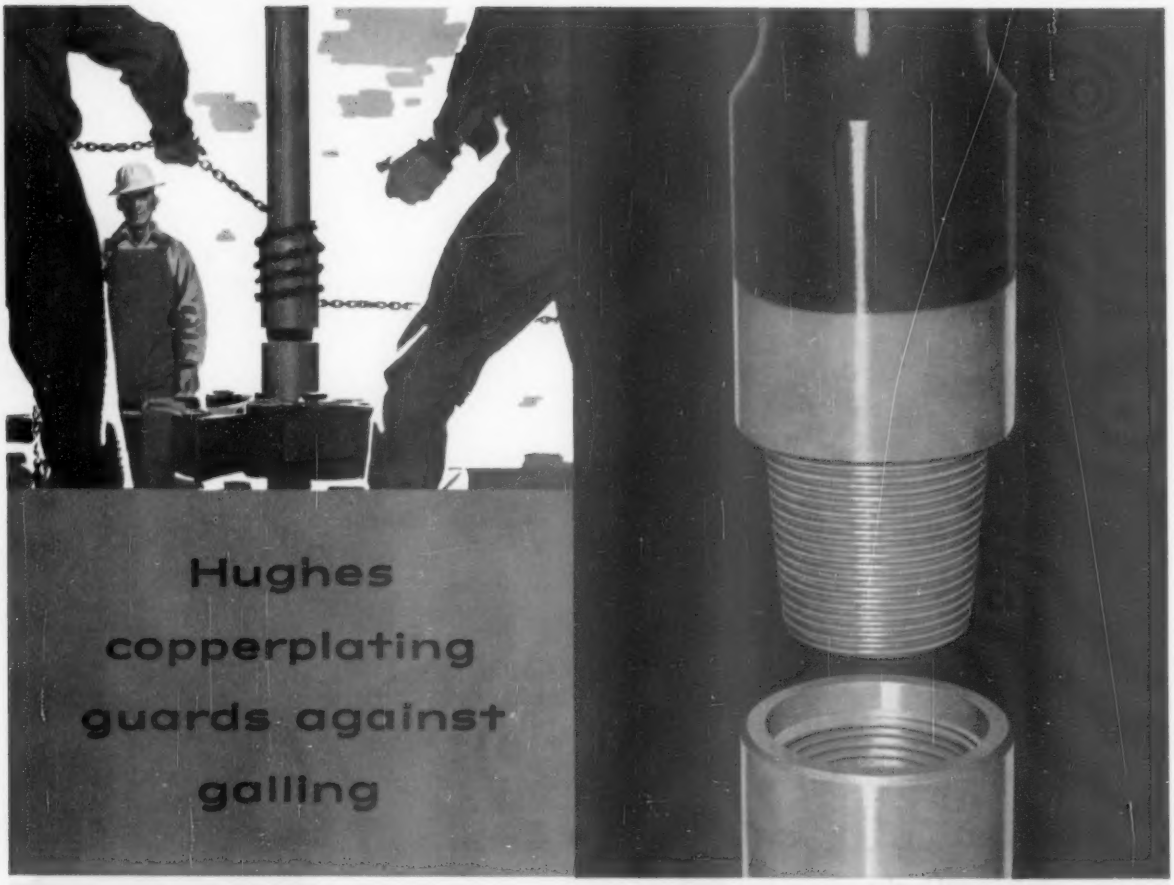

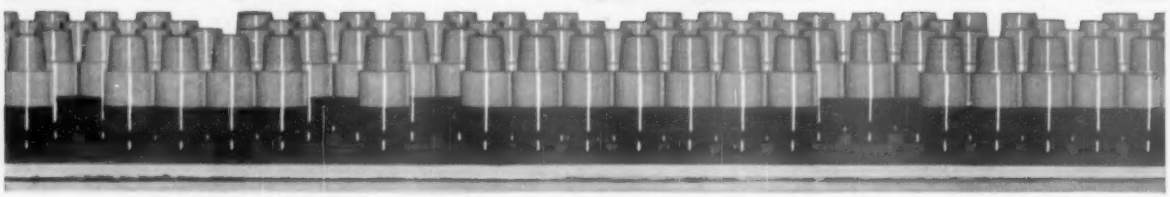

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